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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service
Northeastern Region
Plant Genetics and Germplasm Institute
Vegetable Laboratory
Beltsville, Maryland

THE POTATO-BREEDING PROGRAM, USA, 1973

By
Raymon E. Webb and Others
and
State Cooperators

(Forty-fourth Annual Report by Cooperators)
Agricultural Research Center
Beltsville, Maryland

March 1974

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BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC) (BELTSVILLE, MARYLAND)
AND CHAPMAN AND AROOSTOOK FARMS (PRESQUE ISLE, MAINE)

R. E. Webb (BARC), David R. Wilson (Presque Isle, Me.) and James A. Frank (Orono, Me.)

BARC

One hundred four parents selected for their pest-resistance, high quality, adaptability and skin type were grown in the greenhouse at BARC. Four hundred and twenty-three seed lines were obtained through selective matings. Two hundred and twenty-three seed lines segregating for resistance to viruses A, X, Y, leaf roll, tuber net necrosis, corky ringspot and late and early blight, scab, verticillium wilt and pinkeye, brown rot, golden nematode, the root knot complex, frost, high solids, processing quality, skin and tuber type and adaptability were selected for seedling tuber production in the greenhouse. About 44,000 "A" size seedling tubers were produced at the Beltsville Agricultural Research Center (BARC), Beltsville, Maryland. Approximately 62,000 seedling tubers (sizes A, B, and C) and 20,000 true seed were distributed to cooperators.

DISTRIBUTION

The distribution of true seed, seedling tubers, advance selection and named varieties continued in 1973. A summary of the shipments is given in Tables 1, 2 and 3. True seed, seedling tubers and most of the clonal shipments were made from BARC.

PRESQUE ISLE

The 1973 growing season at both Chapman and Aroostook Farms was less than ideal. Frequent rainfall during the planting period kept the ground too moist for the preparation of a good seedbed and loss of nutrients, particularly N_2 , was considerable prior to and during planting. Heavy rains during July 3-9 caused further nutrient leaching, additional soil compaction and some plot flooding. High temperatures during much of the season, seedbed compaction, and lack of moisture following the early July deluge stressed the plants to the point that yields were reduced by 25 percent or more and tuber conformation of all materials in general was quite poor.

CHAPMAN FARM

Approximately 44,000 seedlings from 223 parental combinations from BARC were planted on Chapman Farm. From these about 1,750 selections were made for observation in 12-hill lots in 1974.

Table 1. Distribution of first-year seedling tubers and true seed of selected parental combinations in the U.S. from ARC-West, Beltsville, Maryland--1973

Location	Cooperator	Progeny No.	Seedling Tuber No.	True Seed No.
Colorado	J. A. Twomey	32	5,364	
Kansas	T. P. Wagner	32	2,326	
Maine	David Wilson	226	44,000	
North Carolina	Frank Haynes	50		20,200
Wyoming	Gene Howard	7	464	
Totals		347	62,154	20,200

Table 2. Distribution of varieties and advanced selections to cooperating States--1973.

State	Cooperator	Varieties	<u>Number</u>	Selections
Alabama	J. L. Turner			23
California	J. E. Gamlen			13
	R. E. Voss			34
Connecticut	Arthur Hawkins			2
Delaware	Robert Stevens	1		5
Florida	James Shumaker	12		166
Kansas	J. K. Greig, Jr.			4
Maine	Paul Eastman			10
	T. H. Houghton, Jr.			7
Maryland	Raymond Rebois	3		10
	V. D. Damsteegt	6		1
Michigan	W. J. Hooker	1		
Mississippi	J. M. Cannon	2		13
Nebraska	Robert O'Keefe			9
New Jersey	C. E. Cunningham			35
	M. R. Henninger	8		91
New York	William Brodie	2		13
	R. C. Cetas			14
	J. B. Sieczka	7		12
	M. B. Harrington			117
	R. L. Plaisted			9
Ohio	Floyd Lower			3
Pennsylvania	J. D. Harrington			3
	Clarence Bryner			4
	James Watts			96
South Carolina	Wayne Sitterly	2		23
Texas	J. C. Miller, Jr.			16
	B. A. Perry	2		13
Virginia	Boyett Graves			141
Totals		46		892

Table 3. Distribution of potato varieties, advanced selections, seedling tubers and true seed to foreign countries.

Country	Cooperator	Number of			
		Varieties	Selections	Seedling tubers	True seed
Brazil	H. Hyland (AID)	2			
Costa Rica	M. A. Seligson	1	9		
El Salvador	Julio Cruz	1	9		
	Juan Olmedo		11		
Israel	Gideon Cohen	2	5		
Nepal	Staley Pitts (AID)	3			
Netherlands	H. T. Wiersema		5		
Nigeria	D. R. Suchomel			2,141	
Peru	Cesar Fribourg		1		
Puerto Rico	J. Enrique Perez	1			
Uganda	Richard Wurster				10,750
Venezuela	Jose A. Gonzalez	2	10		
Totals		12	50	2,141	10,750

Table 4. Weather data, Arcoostook Farm, Presque Isle, Maine, May to October--1973

Date	Temperature 7-day average °F		Precipitation 7-day total inches
	Maximum	Minimum	
5/1-5/7	52.3	39.3	.26
5/8-5/14	59.9	40.1	.46
5/15-5/21	60.1	40.9	1.82
5/22-5/28	54.9	41.7	1.38
5/29-6/4	69.0	45.9	2.67
6/5-6/11	73.6	52.0	.14
6/12-6/18	70.6	47.3	.96
6/19-6/25	80.9	59.6	.40
6/26-7/2	78.7	64.7	.48
7/3-7/9	80.3	65.4	6.48
7/10-7/16	74.9	58.3	.15
7/17-7/23	80.7	53.3	.08
7/24-7/30	87.1	60.4	.19
7/31-8/6	75.9	63.6	1.09
8/7-8/13	77.9	62.7	.88
8/14-8/20	77.7	54.1	.03
8/21-8/27	74.3	50.9	.18
8/28-9/3	81.9	60.9	.75
9/4-9/10	66.6	48.6	.66
9/11-9/17	62.6	43.1	.10
9/18-9/24	56.3	35.3	1.85
9/25-10/1	65.9	38.7	.16

Nine hundred and ninety-five selections were grown in 12-hill lots during 1973 for preliminary evaluation for tuber type, productivity and specific gravity. One hundred and forty-two selections from the 1972 12-hill lots were increased for distribution to cooperators, included in preliminary yield trials and evaluated for processing quality. Most of these selections were included in four or more of the disease evaluation trials conducted on Aroostook Farm and three or more done at BARC. Approximately 300 additional clones were increased for trial by cooperators, used as parental stocks, and as foundation seed for yield and other trials conducted on Aroostook Farm and BARC.

AROOSTOOK FARM

Experimental design for all yield tests was a randomized block with four replications. All plots received 800 pounds of 15-15-15 fertilizer banded in 36-inch rows by a two-row planter. Clones to be tested were hand planted in 25-hill rows with 9-inch spacing. A 1 1/4-inch seed spacing was used in the russet yield trial. Cultural methods and materials for weed, insect, and disease control were according to local recommendations. Rainfall and temperature during the season are given in Table 4. At harvest all entries were graded and samples hand selected for specific gravity and quality evaluations. Specific gravity was determined by the air and water method. After specific gravities were determined, the samples were divided and placed in 50° F and 40° F storage at 90 percent relative humidity.

Samples were fried after 4 months of storage. One set of samples from the advanced yield trials stored at 40° F were reconditioned for two weeks prior to frying (not reported). Potato chips were made from each sample by cutting the tubers in half and taking a 1/16-inch thick slice from each tuber with a rotary food slicer. Slices were rinsed in water and placed on paper towels to remove excess water. Chips were then fried at 340° F in Primex vegetable shortening until bubbling ceased.

A french fry plug 3/8-inch in diameter was cut from each half of the tubers in the sample. After plugs were trimmed, rinsed, and excess water removed, they were fried at 365° F in Primex shortening for 5 minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1 = very light to 10 = very dark. French fry classes ranged from 1 = very light to 5 = very dark. Weighted averages were calculated by multiplying the number of chips or fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made using the PCII reference color chart 1206-U.

After color classification, each french fry plug was broken open and internal texture classified as 1 = mealy, 2 = intermediate, or 3 = soggy and a weighted texture index calculated.

Advanced early maturity yield trial. Four clones and three varieties were included in the trial (Table 5). Planting was done May 18, vines killed August 25, and harvest was September 4. No clone yielded as well as Cobbler. Each of the clones were earlier maturing than either of the three varieties and conformation of the tubers exceeded that of Cobbler. Specific gravities of the four clones were within the variation of that of the varieties and chipping quality equaled or exceeded that of the varieties except Monona when held at either 50° F or at 40° F for four months.

Advanced medium maturity yield trial. Eighteen clones and four varieties were included in the trial (Table 6). Planting was done May 18, vines killed September 4, and harvest was September 14. Yields were lower, specific gravities higher and in general processing quality was better than in 1972. No clone significantly outyielded the variety Superior, although, B6987-56 has the potential given a few days longer growing season. Lines B6955-24, B6987-18, B6987-43, B6987-54, B6987-56, B7167-9, and B7167-30 exceeded Superior in chip quality when held four months at 50° F. Only B6987-56 approached acceptable chip quality when held at 40° F for four months and processed without reconditioning.

Advanced late maturity yield trial. Thirty-four clones and five varieties were included in the trial (Table 7). Planting was done May 18, vines killed September 14, and harvest was September 24. The new variety Hudson produced the highest yields of all entries though not significantly greater than Kennebec, B7033-14 and B7141-1. Hudson does not process well. Line B5141-6, a clone with superior processing quality, was included in the trial as a guide to trends in this characteristic shown by selected clones of more or less equal maturity. Norchip chipped exceedingly well in 1973. Lines B6987-25, B6987-29, B6987-37, B7139-4, B7151-4, B7153-29, B7154-10, B7155-3, B7165-8, and B7200-26 approached or equaled B5141-6 and Norchip in chip quality when held at 50° F for four months. Only B7200-26 approached acceptable chip quality when held at 40° F for four months and processed directly without reconditioning.

Advanced russet yield trial. Seventeen clones and two varieties were included in the trial (Table 8). Planting was done May 18, vines killed September 14, and harvest was September 24. Tuber conformation of all clones was quite acceptable in 1972. Only six clones approached or equaled Norgold Russet in this characteristic in 1973. Russet coverage of tubers in general was less than in 1972. Only B7147-10 produced significantly greater yield than Russet Burbank. Most of the clones produced more tubers of desirable size than Russet Burbank. Most of the clones were equal to or exceeded Russet Burbank in chipping and french fry quality. None of the clones or varieties processed well when stored for four months at 40° F and cooked without reconditioning.

Field resistance to late blight. Sixteen clones, previously identified as highly resistant to late blight in field test plots, Sebago and Kennebec were grown in two separate 4-replicate randomized plots. Both were exposed to infection with late blight during the remainder of the season following inoculation of Green Mountain spreader rows in early August. One plot was sprayed three times during the season with Maneb. The other plot was unsprayed except with an insecticide. By mid-

September disease indices for Sebago and Kennebec in the unsprayed plot were 4.0 and 3.0 and in the sprayed plot 2.0 and 2.0, respectively on a 1-5 scale. Maximum disease index on any resistant clone in the unsprayed plot was 2.0 and 1.0 in the sprayed plot. Differences in yields were noted for the same clones between the two plots but their rank were generally the same in both plots. Yields of Sebago and Kennebec in the sprayed plot were 188 cwt. and 244 cwt. and unsprayed plot 106 cwt. and 141 cwt., respectively.

Table 5. Yields of advanced early clones and varieties harvested 100 days after planting.

Pedigree	Marketable Cwt/A 2" and above	Percent of total yield	Percent of yield 2" and above				Tuber ¹ / rating	Specific ² / gravity	Color Chip	50° F ³ / FF		FF Tex.
			2-2 $\frac{1}{4}$	2 $\frac{1}{4}$ -3 $\frac{1}{4}$	3 $\frac{1}{4}$ -4	>4						
B7132-14	169.9	92.7	34.3	62.6	7.3		2	83	7.6	3.8		1.7
B7134-3	174.0	93.6	22.1	68.0	9.7		2	73	7.3	2.6		2.1
B7148-1	157.9	94.6	20.9	63.2	8.7		2+	77	7.0	3.1		2.0
B7190-2	185.5	92.2	27.7	64.1	8.0		2	78	7.0	2.1		2.0
Cobbler	215.0	89.1	37.3	46.2	3.1		1+	86	7.8	3.0		1.9
Cherokee	161.8	87.9	45.8	51.9	2.1		2	85	8.3	3.4		2.0
Monona	143.1	89.3	44.7	46.4	8.7		2	78	6.2	1.9		2.0
L.S.D.:05	60.0											

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 6. Yields of advanced medium-maturing clones harvested 110 days after planting.

Pedigree	Marketable Cwt/A 2" and above	Percent of total yield	Percent of yield 2" and above				Tuber rating	Specific gravity	Color 50° F		FF Tex.
			2-2 1/4"	2 1/4-3 1/4"	3 1/4-4"	>4"			Chip	FF	
B6951-1	180.3	85.7	62.1	36.0	1.8		3	91	8.7	3.4	2.1
B6955-24	143.6	87.1	53.8	43.9	2.1		2	96	6.0	2.1	2.0
B6967-8	173.1	94.4	37.2	60.5	2.2		3	84	7.2	2.2	2.0
B6987-2	191.9	93.2	24.8	65.4	9.7		3	89	7.2	2.3	1.9
B6987-18	210.2	96.4	15.4	59.1	25.3		2	85	6.5	2.7	2.0
B6987-43	209.4	96.7	16.5	66.1	17.2		2	95	6.0	2.0	1.7
B6987-54	165.3	92.2	30.3	55.7	13.8		3	94	6.4	2.1	1.7
B6987-56	230.5	90.3	44.7	51.1	4.1		3	100	6.3	2.3	1.8
B6987-57	164.4	93.6	28.8	66.4	3.1		2	99	7.0	2.2	2.0
B7009-4	239.6	95.2	25.0	71.5	3.3		2+	82	8.9	3.6	2.0
B7024-17	222.0	95.9	26.8	64.4	8.6		2	95	8.0	3.4	1.9
B7132-29	177.4	88.2	41.3	54.5	4.0		1	90	7.8	3.6	2.0
B7152-14	228.5	93.8	27.9	61.1	10.9		3+	77	8.4	3.5	2.0
B7167-9	168.7	94.4	18.2	74.2	7.5		3	86	6.7	1.8	2.0
B7167-26	164.0	95.1	26.8	71.2	2.7		3+	90	7.3	3.5	2.0
B7167-30	150.4	91.5	32.4	60.4	7.1		2	93	5.9	1.8	1.7
B7200-27	194.8	90.6	38.7	59.7	1.4		3	85	7.2	2.4	2.0
B7221-16	154.4	92.5	45.6	50.1	4.0		3	91	7.3	2.8	1.8
Cherokee	182.9	88.9	43.6	53.4	2.8		2	89	8.0	2.8	2.0
Superior	224.5	94.0	29.6	64.3	6.0		3	90	7.7	2.8	1.9
Seminole	113.6	93.4	33.9	62.7	3.2		2	87	7.1	2.5	2.0
Alamo	163.2	85.3	58.8	40.4	0.6		3	77	7.8	3.8	2.0
L.S.D.	26.7										

1/ 1 = very poor to 5 = outstanding

2/ 1.0 omitted

3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 7. Yields of advanced late maturity clones harvested 120 days after planting.

Pedigree	Marketable Cwt/A 2" and above	Percent of total yield	Percent of yield 2" and above				Tuber ¹ / rating	Specific ² / gravity	Color 50° F ³ / Chip FF		FF Tex.
			2-2 1/2	2 1/2-3 1/4	3 1/4-4	>4					
B6930-6	190.0	89.8	44.7	55.5			2	87	7.9	2.6	2.0
B6930-7	217.7	92.7	35.6	61.4	2.8		2	79	7.8	2.6	2.0
B6934-12	221.1	92.6	38.2	56.4	5.3		2	82	7.2	3.0	1.8
B6955-14	215.0	94.3	24.1	67.9	7.8		1	97	6.8	2.8	1.9
B6966-1	202.4	95.4	21.5	54.0	20.7	3.6	2	99	8.2	3.3	1.8
B6969-9	184.3	90.7	42.7	51.3	5.8		1	80	8.0	3.1	2.0
B6987-1	220.0	93.9	18.2	67.2	12.3	2.0	1+	94	6.8	2.2	1.9
B6987-25	204.1	94.7	23.0	63.0	8.8		1	95	6.2	2.0	1.5
B6987-29	241.0	92.3	31.5	56.4	11.2		1+	99	6.0	1.7	1.5
B6987-37	214.9	93.1	25.5	72.0	6.5	0.7	1+	98	6.1	2.1	2.0
B6987-43	210.3	93.3	34.5	62.5	3.1		2-	95	7.3	2.6	1.1
B6995-19	260.8	94.4	26.0	65.4	8.4		2+	82	7.1	2.4	1.9
B7033-14	245.5	94.5	29.7	63.5	6.6		1	100	8.3	3.6	1.5
B7132-27	125.4	92.1	51.3	48.9			1	92	6.4	2.4	1.9
B7139-4	210.9	95.6	22.3	67.7	14.5	0.3	1+	98	5.8	1.7	1.7
B7139-6	169.5	97.6	47.1	51.1	0.6		1	96	7.1	2.4	1.5
B7141-1	237.6	95.3	22.9	72.0	5.2		2+	93	7.5	2.7	1.5
B7147-36	197.3	91.5	34.7	63.7	1.4		1	90	7.1	2.7	2.0
B7149-4	234.7	92.0	27.0	60.1	12.9		2	83	7.9	3.2	2.0
B7151-4	233.0	93.4	27.7	63.0	9.2		3	99	5.3	1.3	1.4
B7152-1	226.2	91.0	33.8	61.1	5.0		1	86	7.1	2.6	1.7
B7152-3	186.5	91.6	34.9	63.8	1.2		3	80	6.4	2.0	1.9
B7152-12	175.2	90.0	33.3	59.5	7.1		1	85	7.7	2.6	1.8
B7153-29	229.1	88.4	42.0	57.6	0.4		1	91	5.9	2.0	1.8
B7154-10	182.0	90.6	37.0	61.6	1.2		1+	80	5.5	2.0	2.0
B7155-3	239.8	94.0	25.0	65.2	9.9		2-	87	6.2	2.0	1.8
B7160-4	144.0	84.3	55.9	44.0			3	87	7.7	2.6	2.0
B7165-2	238.1	92.3	32.1	61.9	4.5	1.4	2	84	7.1	2.4	2.0
B7165-8	234.2	92.8	26.6	57.6	14.2	1.6	2	86	5.7	1.7	1.9
B7200-6	203.0	91.7	37.9	54.4	7.8		1+	79	8.5	3.5	2.0
B7200-10	213.9	95.2	48.7	48.4	2.8		2	89	8.2	3.8	1.7
B7200-26	212.6	91.4	30.1	66.9	2.9		2+	81	5.2	2.0	2.0
B7200-32	222.3	93.1	30.5	59.5	9.1	2.0	2	81	8.1	2.9	2.0
B5141-6	213.2	90.3	43.3	56.6			2	109	5.8	1.9	1.5

Table 7. (continued)

Pedigree	Marketable Cwt/A 2" and above	Percent of total yield	Percent of yield 2" and above			Tuber ¹ / rating	Specific ² / gravity	Color 50° F ³ / FF		FF Tex.
			2-2 $\frac{1}{4}$	2 $\frac{1}{2}$ -3 $\frac{1}{4}$	3 $\frac{1}{4}$ -4			Chip	FF	
Katahdin	199.0	93.6	30.7	67.2	2.2	2+	86	7.8	2.8	2.0
Norchip	208.1	83.9	59.1	39.7	1.0	1	93	5.5	1.5	1.4
Kennebec	256.9	95.1	22.0	63.1	12.8	2	90	6.5	2.0	1.8
Rus. Burbank	210.4	79.4	56.6	43.3		1	88	8.1	3.2	2.0
Hudson	277.8	95.1	14.8	50.4	26.1	2	87	9.0	3.9	1.9
L.S.D.	40.4									
	.05									

1/ 1 = very poor to 5 = outstanding2/ 1.0 omitted3/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

Table 8. Yields of advanced russet clones harvested 120 days after planting.

Pedigree	Marketable Cwt/A 2 oz. and above	Percent of total yield	Percent of yield 2-6 oz. 6-12 oz. 12-16 oz. 16 oz.	Maturity ¹ /Tuber ² / Rating	Specific ³ / Gravity	Color 50° F ⁴ / Chip FF	FF Tex.
B7147-6	250.1	92.1	26.9	66.4	6.8	8.4	3.7
B7147-8	243.8	90.5	31.4	66.7	1.8	6.6	2.0
B7147-9	220.6	91.7	33.9	64.7	1.5	7.6	2.7
B7147-10	348.7	92.0	32.8	59.1	5.3	8.2	3.2
B7147-15	328.3	96.9	15.3	61.1	20.5	7.9	3.0
B7147-20	288.6	95.8	26.0	68.5	4.5	8.0	3.4
B7147-40	247.8	96.7	24.4	72.0	3.4	6.3	2.3
B7147-64	120.2	87.6	40.0	53.0		6.9	2.3
B7188-56	275.0	91.3	44.3	54.2	1.4	6.1	2.0
B7196-1	306.2	94.7	23.5	74.1	20.9	8.1	3.2
B7196-4	263.1	91.5	41.5	56.0	2.3	7.3	2.5
B7196-20	306.8	96.4	11.8	57.4	28.0	7.9	3.4
B7196-23	267.1	93.4	17.1	65.1	15.4	9.6	4.4
B7196-25	261.4	96.0	23.2	70.7	7.3	6.4	2.7
B7196-37	264.2	91.5	35.4	64.3		6.7	2.5
B7196-45	295.4	94.3	28.7	69.2	2.1	7.5	2.9
B7196-64	184.3	88.0	55.6	44.0		6.7	2.5
Nor. Russet	271.0	90.3	33.2	62.7	11.9	9.9	4.8
Rus. Burbank	251.2	84.7	44.2	00.9	0.6	8.0	3.2

L.S.D. .05

78.0

1/ 0 = very early; 1 = early; 2 = medium early; 3 = medium; 4 = medium late; 5 = late; 6 = very late

2/ 1 = very poor; 5 = outstanding

3/ 1.0 omitted

4/ Chips, 1-7 satisfactory; FF, 1-3 satisfactory; Tex, 1-2 satisfactory

USDA, Presque Isle, Maine

James Frank, David Wilson, and R. E. Webb

Disease Resistance Evaluations

The USDA potato disease testing program is an important step in the development of new breeding materials. This testing is carried out on Aroostook Farm in Presque Isle, Maine. The tests are conducted in isolated plots to prevent interference from other disease tests. The purpose of these tests is to remove the very susceptible seedlings from the breeding stocks and to rate all other seedlings as to their degree of resistance or tolerance. These reactions are merely indications of how the seedlings respond to disease situations under Maine environmental conditions. The resultant reactions will vary somewhat from year to year in the same location and also in different locations in the same year.

Weather conditions this year were optimum for Verticillium, average for early and late blight, and poor for scab development. The moisture levels were very high throughout May and June thus providing heavy soil moisture during tuberization. The moisture level is the prime factor in scab development during tuberization. Since many of our pedigrees are late, we did get some scab formation. The extremely high summer temperature favored the wilt pathogen. The high temperature recorded weekly from June 1st through August 30th never fell below 90° F. The rainfall in late July and early August allowed the late blight and early blight to get anchored in our plots, but due to the extreme dryness that followed, the epidemic appeared to slow down considerably.

Resistance to Verticillium Wilt (Verticillium albo-atrum). Inoculum for this test was grown in potato dextrose broth in shake culture. The bud cells from each flask were pooled and adjusted to 80,000 cells per ml. Two isolates of the pathogen were used to insure pathogenicity. The tubers of the test clones were cut, dipped with the inoculum, and planted immediately. The inoculated seedpieces were covered with soil, and a full hill was made immediately after planting. The test consisted of two four-hill plots per pedigree.

Wilt readings were made on five separate days starting in late July. The final readings for the two replications were averaged and reported in the tables following. Readings were made on a 1-5 scale with one indicating no disease and five signifying plant death. The average rating for susceptible checks Cherokee and Kennebec were 4.3 and 4.4, respectively. The average for the resistant variety Abnaki was 1.4 while Houma, moderately resistant, averaged 1.8.

After tubers were harvested, readings were taken to determine the percentage of tubers in each test showing pink eye, a bacterial disease which appears after harvest or storage. This organism has generally been associated with Verticillium, thus the tubers harvested in the Verticillium plot were all washed and examined. In the following tables, the reading in the pink eye column is reported as the percentage of total tubers infected in a pedigree. The susceptible variety Kennebec averaged 22 percent, while wilt-resistant Abnaki averaged 1 percent.

Resistance to Late Blight (*Phytophthora infestans*). Test clones were planted along with the variety Green Mountain, which served as a susceptible spreader. The Green Mountains were planted as guard rows and every third row in the plot. The plot consisted of two replications of a two-hill plot. The plot was inoculated with a race 0 (common race) zoospore suspension in the last week of July and twice a week thereafter until the Green Mountains showed a heavy infection. Readings were taken once a week until plants were ready for harvest. Readings were made on a 1-5 scale with one indicating no disease and five signifying complete susceptibility. The susceptible Green Mountain variety averaged 5.0 while Kennebec, resistant to race 0 averaged 2.4.

Resistance to Early Blight (*Alternaria solani*). This field test consisted of two-hill plots, replicated twice with the guard rows, and every third row throughout the plot planted with a susceptible spreader (B5281-1). The spreader rows were inoculated with a spore suspension in late July, and the pathogen developed rapidly and spread throughout the plot. Readings were taken once a week until plants were ready to harvest. Readings were made on a 1-5 scale with one indicating no disease and five signifying susceptibility. The resistant variety Kennebec averaged 2.0 throughout the plot.

Resistance to Common Scab (*Streptomyces scabies*). Tubers of the test clones were planted in the same field used in previous years for this test. The test consisted of two replications of a two-hill plot with susceptible Green Mountain planted as guard rows and every third row in the plot. The tubers were dug after Labor Day, and each tuber was rated and placed into a class. The two figures in the tables represent the number of tubers observed and the disease rating. The figure for disease rate is surface area affected/lesion type. For area: 0 = none; 1 = 1-19%; 2 = 20-29%; 3 = 40-59%; 4 = 60-79%; and 5 = 80-100%. For type: 0 = none; 1 = small, superficial lesions; 2 = medium-large but superficial; 3 = large, slightly raised, or sunken; 4 = large and rough; 5 = coalesced and pitted. Green Mountain, the susceptible check, averaged 2/3 while the resistant Cherokee averaged 1/1.

Presque Isle Table 1. Pedigrees tested in all disease trials, 1973.

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
BR68277-32	1.7	0	3.0	3.0	3/2
B7147-8	2.3	0	3.5	4.0	0
B7147-15	1.5	0	3.0	3.5	0
B7147-17	2.5	0	3.5	3.0	T/2
B7147-21	5.0	42	3.5	4.0	T/4
B7147-40	2.7	0	3.5	4.0	T/3
B7159-25	1.0	0	3.5	3.0	0
B7164-2	3.2	0	2.5	3.0	4/4
B7164-18	4.5	22	3.0	2.5	3/5
B7164-27	4.4	48	4.0	3.0	1/4
B7196-1	3.7	0	3.0	3.0	1/4
B7196-4	3.8	0	4.0	3.5	T/2
B7196-7	4.3	0	3.5	4.0	T/4
B7196-20	2.8	6	4.0	3.0	T/2
B7196-23	4.3	0	3.5	4.0	1/4
B7196-27	3.3	0	3.5	3.5	T/2
B7196-29	2.6	0	2.5	2.0	T/1
B7196-36	5.0	0	4.5	4.0	1/1
B7196-37	4.7	0	2.5	4.0	1/4
B7196-40	4.0	0	3.0	3.0	1/1
B7196-56	2.3	0	3.0	3.0	T/1
B7196-64	4.2	0	3.5	3.5	1/5
B7200-33	4.7	14	1.0	3.0	2/2
B7578-1	4.2	0	3.5	2.5	4/4
B7584-10	4.3	0	3.5	4.0	0
B7607-3	4.4	0	3.5	3.5	T/1
B7634-2	4.9	0	4.0	4.0	3/3
B7637-7	3.3	0	3.5	3.5	2/2
B7644-1	1.0	0	3.0	3.5	2/4
B7645-12	1.1	0	3.5	4.0	1/1
B7655-9	3.9	0	3.5	4.0	0
B7657-1	2.2	0	3.0	3.5	2/1
B7657-6	3.6	0	3.5	4.0	2/1
B7732-2	4.4	8	3.5	4.0	0
B7572-2	3.7	0	3.5	3.0	3/4
B7572-4	4.3	7	3.0	3.0	2/3
B7573-3	4.7	0	2.5	3.0	3/4
B7575-1	4.4	0	4.0	4.0	1/3
B7576-3	3.2	0	2.0	3.0	1/4
B7583-6	1.2	0	3.0	3.5	T/3
B7583-19	3.8	22	2.5	3.0	T/2
B7584-8	4.2	52	2.5	3.0	1/2
B7587-5	2.5	0	4.0	4.0	T/3
B7589-5	3.7	10	3.5	4.0	1/3
B7589-9	3.4	16	3.5	3.0	1/4
B7590-1	2.0	0	3.5	3.0	3/4
B7590-6	3.4	19	3.5	3.5	2/5
B7592-1	3.5	0	3.0	3.0	3/3

Table 1. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B7595-2	4.9	0	4.0	4.0	2/3
B7595-3	4.9	0	4.0	4.0	3/4
B7595-7	4.7	0	4.0	3.0	2/2
B7597-1	4.5	0	3.5	4.0	2/2
B7602-1	1.9	50	3.5	2.5	3/3
B7602-2	4.2	0	3.0	3.0	4/4
B7603-1	4.9	0	2.5	3.0	3/4
B7603-6	4.4	15	3.0	3.0	2/3
B7603-7	4.9	0	3.5	3.0	1/2
B7608-1	3.2	0	3.0	2.5	T/3
B7608-2	3.8	0	3.0	3.0	1/2
B7608-4	3.4	25	3.5	3.0	0
B7610-1	1.4	6	3.5	3.0	1/1
B7611-5	4.9	75	4.0	3.5	2/2
B7612-5	5.0	0	4.0	4.0	1/2
B7613-1	3.2	0	3.5	3.0	T/3
B7617-1	4.2	0	3.5	3.0	2/3
B7618-6	4.5	0	3.5	3.5	2/3
B7619-15	3.4	0	3.5	3.5	1/3
B7620-4	4.9	57	3.5	3.0	1/3
B7620-7	3.8	0	3.5	3.0	3/5
B7621-1	1.8	15	3.5	3.0	3/3
B7621-2	3.8	4	3.5	3.0	3/5
B7621-5	3.3	0	3.0	3.0	3/4
B7621-9	3.3	36	3.5	3.0	3/3
B7621-10	3.2	22	3.5	3.0	4/5
B7623-1	3.2	0	4.0	3.0	3/3
B7629-1	4.2	0	3.5	2.5	2/2
B7629-3	4.8	44	3.5	3.5	3/3
B7629-6	4.8	11	3.5	3.5	2/3
B7631-5	4.0	33	3.5	3.5	2/3
B7631-8	4.9	0	4.0	4.0	3/3
B7632-3	2.4	14	3.5	3.5	2/3
B7635-1	5.0	0	4.5	4.0	2/2
B7635-2	3.7	35	3.5	3.5	1/2
B7635-4	3.9	0	3.5	3.5	2/4
B7636-4	4.9	0	3.5	3.0	2/3
B7637-9	3.9	0	3.0	2.5	0
B7640-10	4.7	0	3.5	3.0	1/2
B7642-2	3.9	37	3.5	3.0	2/3
B7646-1	3.3	0	3.5	3.0	2/4
B7649-5	4.8	27	3.5	3.5	1/3
B7650-4	4.3	0	3.5	5.0	T/5
B7650-6	3.6	0	3.5	3.5	1/4
B7650-9	3.8	0	4.0	4.0	2/3
B7650-19	4.4	0	3.5	3.5	2/3
B7652-3	2.9	0	3.0	3.0	3/4
B7654-1	4.9	0	4.0	3.0	2/3
B7654-12	4.8	13	3.5	3.5	3/4

Table 1. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B7657-5	4.0	0	3.5	4.0	1/3
B7658-2	3.7	0	3.5	3.5	2/3
B7663-5	3.0	0	3.5	4.0	1/2
B7664-2	4.3	0	3.5	3.0	3/4
B7667-2	4.4	0	3.5	3.0	2/4
B7668-1	4.2	0	3.0	3.5	1/2
B7670-2	1.8	0	4.0	3.0	2/3
B7670-4	2.0	0	2.5	2.5	2/3
B7676-2	3.8	0	4.0	4.0	2/4
B7677-2	2.4	0	3.5	3.5	T/3
B7678-2	4.9	0	4.0	4.0	3/3
B7678-6	2.6	0	4.0	4.0	3/2
B7678-8	2.6	0	3.5	4.0	1/2
B7678-12	3.8	0	3.0	3.5	1/1
B7678-13	5.0	0	4.5	4.0	T/1
B7678-17	3.8	0	4.0	3.0	3/2
B7679-9	2.4	0	3.5	3.5	T/1
B7680-3	3.8	0	4.0	4.0	T/2
B7680-6	3.6	0	3.0	4.0	1/1
B7680-10	1.9	5	3.5	4.0	1/3
B7683-6	3.2	0	4.0	3.0	2/3
B7684-3	3.0	0	3.0	3.0	T/1
B7684-4	2.5	0	3.0	3.0	T/1
B7684-6	4.9	0	4.5	3.5	1/2
B7684-7	4.2	0	3.5	5.0	1/1
B7685-7	5.0	13	4.0	4.0	2/3
B7685-8	5.0	0	4.0	4.0	1/2
B7687-3	1.4	12	4.0	3.5	3/4
B7694-1	4.7	0	3.5	3.5	3/3
B7698-1	2.4	6	1.0	2.0	3/3
B7702-1	4.3	0	3.5	3.0	2/3
B7707-1	3.2	0	2.0	3.5	2/3
B7707-5	4.9	40	1.0	2.0	2/3
B7708-2	3.4	0	4.0	2.5	2/3
B7711-1	2.9	0	3.0	2.0	T/2
B7711-2	3.9	0	3.5	4.0	2/4
B7711-11	1.8	0	4.0	3.0	2/1
B7715-11	4.4	0	3.5	3.0	2/3
B7755-1	3.1	0	3.5	3.0	1/3
B7763-3	3.6	18	1.0	3.0	2/3
B7766-2	4.3	71	3.5	3.5	1/4
B7767-1	4.0	0	4.0	4.0	T/4
B7767-2	4.2	0	1.0	4.0	T/2
B7768-3	4.8	35	1.0	4.0	T/3
B7768-4	4.5	0	4.0	3.5	T/4
B7772-5	3.3	0	3.5	3.0	1/3
B7781-13	2.8	0	3.5	3.5	1/2
B7783-6	1.8	0	3.0	3.5	T/1

Table 1. continued

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B7783-7	4.7	67	4.0	4.0	1/3
B7786-3	1.4	0	3.0	3.5	2/3
B7802-2	4.6	18	1.0	4.0	2/3
B7805-1	2.2	0	2.5	3.0	3/3
B7805-6	4.1	4	4.0	3.5	3/4
B7807-2	4.1	6	4.0	3.0	3/2
B7809-5	4.9	0	1.0	3.0	3/5
B7813-5	4.9	18	1.0	3.5	1/1
B7825-5	4.8	0	3.5	3.5	2/2
B7828-1	5.0	33	4.0	4.0	2/3
B7828-5	4.8	0	4.0	3.5	3/4
B7828-9	3.3	0	3.5	4.0	3/4
B7830-4	4.0	0	3.5	3.5	1/3
B7830-6	3.4	0	4.0	3.5	2/2
B7832-2	2.8	0	3.0	2.5	2/4
B7837-6	2.1	7	4.0	2.5	2/2
B7838-2	4.9	5	3.0	3.0	2/4
B7839-7	4.1	0	4.0	3.5	1/3
B7840-2	3.9	8	3.5	3.0	1/2
B7845-4	2.5	4	1.0	2.5	T/2
B7845-6	1.8	0	1.0	3.0	T/2
B7845-7	3.3	0	1.0	3.0	T/2
B7845-9	4.2	0	1.0	3.5	T/1
B7845-10	4.9	40	1.0	3.5	T/1
B7845-14	2.4	0	1.0	3.0	1/3
B7845-16	3.7	21	1.0	2.0	2/3
B7845-17	4.4	0	1.0	2.5	1/3
B7845-19	4.1	0	1.0	3.0	1/3
B7845-21	3.9	5	1.0	3.0	3/3
B7845-23	4.4	10	3.5	4.0	3/4
B7845-26	3.3	7	1.0	3.0	2/3
B7848-2	3.7	14	4.0	3.0	2/4
B7848-11	2.4	0	3.0	3.0	3/3
B7848-13	4.2	0	4.0	4.0	2/5
B7848-16	3.9	0	4.0	4.0	2/2
B7848-19	3.2	0	3.0	3.0	1/3
B7848-23	4.7	0	4.0	3.5	2/2
B7849-3	2.8	10	4.0	3.0	2/3
B7849-5	1.3	0	4.0	4.0	2/3
B7853-2	4.1	0	3.5	3.5	2/3
B7858-4	4.5	0	4.0	3.0	1/3
B7858-5	4.9	0	4.0	3.5	2/5
B7858-6	4.5	25	1.0	2.0	3/2
B7859-2	3.7	13	4.0	4.0	3/4
B7861-2	1.8	0	3.0	3.0	T/1
B7863-2	4.8	38	2.5	3.0	T/1
B7863-5	1.0	0	3.0	3.0	2/3
B7863-6	3.6	11	3.0	2.5	1/2

Table 1. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B7865-12	4.8	21	1.0	3.5	1/1
B7865-14	4.8	0	4.0	4.0	1/1
B7866-3	4.2	0	3.0	2.5	2/3
B7871-3	1.8	0	2.0	2.5	2/2
B7871-5	4.4	0	3.5	3.5	2/2
B7876-1	4.3	15	4.0	3.5	2/3
B7881-3	2.2	0	1.0	2.0	3/3
B7888-7	3.7	27	1.0	2.5	3/4
B7888-8	4.4	0	1.0	4.0	2/4
B7888-9	4.4	9	1.0	2.5	3/3
B7897-1	3.9	7	1.0	3.5	2/4
B7897-3	2.3	14	1.0	2.5	2/4
B7898-5	3.8	19	3.0	2.5	2/3
B7901-3	1.8	0	3.0	3.0	1/2
B7901-5	3.3	0	3.5	2.5	2/2
B7902-2	2.9	20	4.0	3.0	2/3
B7903-1	2.0	0	1.0	3.0	2/3
B7903-8	3.3	38	3.0	3.5	1/2
B7905-2	4.8	0	2.0	3.0	2/3
B7905-5	4.9	0	4.0	3.5	1/3
B7905-8	3.5	21	1.0	3.0	1/3
B7910A-6	3.7	6	1.0	2.0	1/2
B7910A-7	3.1	0	1.0	2.5	T/3
B7910A-11	3.8	13	3.0	2.5	2/2
B7911-1	4.8	0	1.0	3.0	2/2
B7913-1	4.1	0	1.0	2.0	1/2
B7914-2	4.4	0	1.0	3.0	2/3
B7918-3	4.4	33	1.0	3.5	T/2
B7920-2	3.8	32	3.0	2.5	2/3
B7925-3	4.7	0	1.0	3.0	2/3
B7927-1	4.3	0	4.0	3.5	3/3
B7928-4	4.9	0	1.0	3.5	2/3
B7928-7	4.9	0	4.0	3.5	T/2
B7929-3	2.3	0	1.0	2.5	1/2
B7929-5	1.3	0	3.0	2.0	2/3
B7929-6	1.8	0	1.0	2.0	2/2
B7929-8	3.1	0	3.5	2.5	T/2
B7929-11	2.0	0	1.0	2.5	2/2
B7930-2	2.3	0	4.0	3.0	2/3
B7930-5	2.0	0	4.0	3.0	2/3
B7934-3	3.8	0	4.0	2.5	3/3
B7936-1	5.0	67	3.0	2.5	1/2
B7939-4	3.6	0	3.0	4.0	1/3
B7952-2	3.3	13	3.5	3.5	T/1
B7953-2	3.4	38	3.0	3.0	1/2
B7957-4	5.0	36	3.5	3.0	2/3
B7957-5	4.6	58	1.0	3.0	T/2
B7967-1	4.7	0	4.0	4.0	1/3

Table 1. continued

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B7978-1	1.4	4	2.5	2.5	2/3
B7978-2	2.3	3	3.5	3.0	T/1
Green Mtn.			5.0		2/3
Kennebec	4.4	22	2.4	2.0	
Abnaki	1.4	1			
Cherokee	4.3	18			

Presque Isle Table 2. Pedigrees not included in all disease trials, 1973

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
BR7088-1					1/2
BR7103-2	4.4	26			
BR7110-3	4.2	13			
B6930-1	3.7	0			
B6930-16	4.0	42			
B6932-5	3.5	25			
B6943-22	4.2	0		3.0	2/5
B6943-43	1.4	0		3.0	
B6943-46	4.1	0		3.0	
B6943-64	1.8	6		3.0	
B6952-14	1.3	00		2.0	
B6952-21	4.5	50		3.0	
B6955-4	4.1	44		3.0	
B6955-10	4.2	0	1.0	2.0	
B6955-67			3.5		
B6980-47	2.5	11		3.0	
B6985-16	4.0	10		2.5	
B6985-36	4.0	0		3.0	
B6985-67	3.2	23		3.0	
B6986-40	3.1	0		2.5	
B6987-86	2.9	0		3.0	3/3
B6987-131	4.3	0		3.5	
B2987-136	2.2	0		2.5	
B6987-142	4.5	29		4.0	
B6987-145	2.9	0		3.5	
B6987-148	3.4	0		3.0	3/4
B6987-158	3.9	0		2.5	
B6987-162	3.9	13		2.5	2/2
B6987-168	4.2	0		3.0	2/5
B6987-184	1.3	0		3.0	
B6987-187	1.3	0		3.5	
B6987-221	4.9	17		3.5	
B6998-15	3.4	0		2.5	
B6998-19	4.0	0		2.0	
B6998-41	2.4	0		3.0	
B7024-33	3.7	36			
B7024-35	4.2	29		3.0	
B7024-55	4.4	5		4.0	
B7024-60	4.5	37		2.0	
B7024-64	3.9	43		3.5	
B7024-85	4.9	13		3.5	
B7024-99	4.0	0		4.0	
B7033-40	4.8	24		4.0	
B7033-49	5.0	0		3.0	
B7033-75	3.9	0		3.5	
B7143-18	3.8	0		4.0	0
B7147-21	4.3	7			
B7147-37	3.7	0	3.5	4.0	
B7147-76	3.0	0		3.0	

Table 2. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B7147-90	4.3	0		4.0	
B7155-26	1.0	0	4.0		
B7188-2	3.4	0			
B7196-74	3.3	0			
B7196-104	5.0	0			
B7200-6	4.7	0	2.5		
B7200-10	3.5	0	2.5	2.5	
B7200-26	4.5	0	2.5		3/3
B7200-27	4.5	0	3.5		T/1
B7200-32	2.2	0	1.0	2.0	
B7200-35	4.0	0	1.0		T/2
B7200-40	3.6	0			3/3
B7222-29	4.8	0		4.0	
B7632-2					2/4
B7633-2	4.2	0	3.5	3.0	
B7743-4	2.7	0		2.0	3/4
B7748-4			3.0		
B7845-29	3.5	0		3.0	2/5
B7863-1	3.5	0		2.0	2/1
B7872-7	3.3	15			3/3
B7958-1	3.5	0			3/3
B7990-1	3.2	15	3.0	3.0	
B7990-2	4.0	0	4.0	3.5	
B7991-1	2.7	0	4.0	3.0	
B7997-10	4.0	12	4.0	3.0	
B7997-11	4.7	43	4.0	3.5	
B8004-1	3.8	14	1.0	3.5	
B8004-3	4.3	17	3.0	3.5	
B8004-8	3.0	0	1.0	3.0	
B8016-4	5.0	0	4.0	4.0	
B8017-1	2.2	0	1.0	2.5	
B8017-6	2.2	0	1.0	3.0	
B8017-7	1.5	0	4.0	3.5	
B8018-2	1.9	0		3.5	
B8018-3	3.3	0	4.0	3.5	
B8018-4	4.4	17	3.0	3.5	
B8019-4	4.0	0	3.5	4.0	
B8019-7	4.2	14	1.0	2.5	
B8024-1	4.3	5	3.0	3.5	
B8036-1	1.7	0	3.5	3.0	
B8036-3	2.4	6	3.0	2.5	
B8036-4	2.4	7	4.0	3.5	
B8050-1	2.9	20	4.0	3.5	
B8050-2	3.6	22	4.0	3.0	
B8050-4	3.9	18	3.0	3.0	
B8054-2	4.2	24	4.0	3.0	
B8070-7	3.2	0	2.0	3.0	
B8073-3	4.4	56	1.0	3.5	
B8086-3	3.5	18	4.0	3.0	

Table 2. continued.

Pedigree	Vert	Pink eye	Late blight	Early blight	Scab
B8087-6	2.3	0	4.0	3.5	
B8088-2	4.8	13	3.5	3.5	
B8091-8	4.7	13	4.0	3.0	
B8097-2	4.9	0	1.0	3.0	
B8101-3	4.0	7	1.0	3.5	
B8108-3	2.9	0	3.0	3.5	
B8111A-5	3.9	0	3.5	3.0	
B8112-16	4.7	0	1.0	2.0	
B8113-12	3.3	8	3.0	3.0	
B8123-3	1.5	0	1.0	3.0	
B8123-11	3.5	0	1.0	2.5	
B8123-12	4.1	0	1.0	2.5	
B8125-5	1.6	0	3.5	3.0	
B8126-4	4.0	0	1.0	3.0	
B8131-1	3.7	7	3.0	3.0	
B8132-4	4.3	0	1.0	3.0	
B8140-1	4.9	0	4.0	3.5	
B8145-1	1.9	7	4.0	3.5	
B8148-4	4.9	37	1.0	2.5	
B8151-1	4.9	0	4.0	3.0	
B8154-9	5.0	0	3.5	3.5	
A64140-3				3.0	
A66107-51				3.0	
A66133-8				3.0	
A67315-7				3.0	
A67373-13				3.0	

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

P. R. Rowe, S. J. Peloquin and R. W. Ross

Introduction of New Stocks. Three hundred seventy-four new stocks were received from nine countries. Most were true seed introductions of non-cultivated species provided by organized expeditions collecting through Argentina, Bolivia and Peru.

Preservation and Increase of Stocks. Approximately 90% of the introductions now contained in the collection are maintained as true seed. Satisfactory increases of 273 seed introductions were obtained under glass, plastic or screen. Recently-harvested seed samples of 255 introductions were packaged for storage in the National Seed Storage Laboratory.

Germinative percentages of 2092 seed lots 2-22 years old were determined. Fifty-seedling samples of 644 seed increase lots were grown to detect mechanic admixtures that can happen in the course of the extraction and packaging process.

Classification. One thousand eighty-three herbarium specimens representing intraspecific variability, plus 130 separated-corolla preparations and 130 leaf specimens, were collected and prepared from seedling populations of 346 species introductions. This included specimens requested by Solanum taxonomists J. G. Hawkes, Birmingham, England and K. A. Okada, Balcarce, Argentina for further study and inclusion in their herbaria. Professors Hawkes and Okada spent two weeks here examining seedling progenies to substantiate or disprove provisional classifications proposed at the sites of their last collections.

The project assistant spent two weeks with J. P. Hjerting, Copenhagen, Denmark to assist in plotting the collection sites of all cultivated species introductions contained in the IR-1 collection. Professor Hjerting had spent two months in Sturgeon Bay in 1972, plotting collection sites of all of the non-cultivated species introductions. The resultant maps will be used to plan future collecting expeditions, in an effort to broaden the base of more of the species available as sources of germplasm for potato improvement.

Distribution of Stocks. Seed and tuber shipments were sent to potato workers in 20 states within this country and in 26 other countries. Shipments included 1503 seed and 1064 tuber samples of species introductions, and 70 seed and 1099 tuber samples of germplasm developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project, involving species introductions.

Nearly 50 additional copies of the 1972 "Inventory of Interspecific and Intervarietal Hybrids of Tuber-Bearing Solanum Species" and 17 additional copies of the 1969 "Inventory of Tuber-Bearing Solanum Species" were distributed upon request. The 1974 revision of the latter publication will be handed to the printer in February. A mimeographed listing of 217 species introductions available in the form of tuber families (mainly for the benefit of those without adequate greenhouse facilities) was distributed to 192 potato workers.

Evaluation of Stocks. A form letter eliciting current information on evaluations and published or unpublished reports of researches utilizing the IR-1 stocks distributed July 1969 - July 1972 was sent to 103 of the potato workers who requested seed or tubers in this interim. Excluded were recipients who had reported their findings earlier. All data received in reply have been incorporated into the 1974 "Inventory of Tuber-Bearing Solanum Species".

The somatic chromosome numbers of 267 species introductions were determined.

Foreign Visitors.

J. G. Hawkes, University of Birmingham, Birmingham, England
K. A. Okada, Estacion Experimental Agropecuaria, Balcarce, Argentina
Americo Mendiburu, Estacion Experimental Agropecuaria, Balcarce, Argentina
Emma Losa, Universidad Agraria, La Molina, Lima, Peru
Primo Accatino, International Potato Center, La Molina, Lima, Peru
Fermin de la Puente, Estacion Experimental Agricola La Molina, Lima, Peru
Magnhild Umaerus, The Swedish Seed Association, Svalov, Sweden

Usefulness of Findings. The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily-available reservoir of useful breeding stocks. Breeders are constantly searching for new sources of superior germplasm and are conducting incessant researches to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Five new potato varieties (Hudson, Nampa, Nooksack, Snowchip and Targhee) were released for commercial production in late 1972-1973. Each pedigree involves 5-7 introductions. One hundred twenty-nine of the 133 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigree. These varieties presently compose about 65% of the annual seed potato production in the United States.

Basic research programs conducted in several states and other countries are developing information concerning the potential value and diversity of the Solanum species. In 1973, 15 papers, 11 abstracts and 7 theses reporting the use of Solanum introductions were published. These researches will provide the knowledge necessary for more effective utilization of the Solanum species.

NORTH DAKOTA

R. H. Johansen and Cooperators ^{1/}

North Central Regional Trials--1973

The year 1973 marked the twenty-third year that the North Central Regional Trials have been conducted. Ten states had planned to participate in the 1973 trials, however because of unfavorable weather conditions in the spring, Missouri was unable to plant a trial. Nebraska again planted two trials, an early and late and Indiana withdrew from the North Central Trials. South Dakota conducted a trial after being absent for one year. The trial in South Dakota is now being conducted by the Department of Horticulture. The Minnesota trial was transferred from Crookston to Elk River, Minnesota.

Recent potato variety introductions that have been tested in the North Central Regional Trials -

<u>Progeny No.</u>	<u>Year Released</u>	<u>Released by</u>	<u>Released Name</u>	<u>Parentage</u>
W 629	1973	Wisconsin	Wischip	55-232.58 x W 231

Environmental Conditions. Soil type ranged from clay loam to course sand. Sandy loam or silt loam was the most common soil type.

Cultural Practices. Fertilizer applications, irrigation, spray programs, vine killing, spacing, etc. were based on local conditions.

Chloradane, Thiodan, Sevin, Di-Syston, Thimet, Metasystox R, Monitor, Malathion, were used as insecticides and Polyram, Bravo, Manzate, Dithane M45 and M22, Zineb, and Maneb were used as fungicides. For weed control Eptam, Lorox and Maloran were used. Vines were killed by roto-beating and chemicals such as Evik, Dinitro and Des-I-cate were used.

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days To Harvest</u>
Kansas	April 2	July 27	117
Louisiana	Jan. 18	May 22	125
Minnesota	April 26	Aug. 23	120
Michigan	May 10	Sept. 20	134
Nebraska (summer)	April 14	Aug. 17	126
Nebraska (fall)	May 22	Sept. 20	153
North Dakota	May 8	Oct. 27	174
Ohio	May 3	Sept. 19	145
South Dakota	April 19	Sept. 24	149
Wisconsin	May 9	Sept. 14	129

^{1/} Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, N. Thompson; Minnesota, O. Turnquist and F. Lauer; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. H. Johansen; Ohio, A. R. Mosley; South Dakota, P. Prashar; Wisconsin, J. Shoenman, D. Kichefski and S. Peloquin; USDA, R. Webb; Alaska, C. Dearborn.

The 1973 growing season was probably somewhat dryer than in previous years. Low rainfall existed in North Dakota, Michigan, Nebraska, Ohio, and South Dakota. Temperature throughout the season varied at different locations but in general temperatures were near or slightly below normal. Ohio was about the only state reporting an unusually warm August and September. The trials in Kansas, Michigan, Minnesota, Nebraska, South Dakota, and Wisconsin required irrigation throughout the season.

Entries. Entries were received from North Dakota, Nebraska, Minnesota, Wisconsin, Louisiana, and Michigan. North Dakota supplied the check varieties, Norland, Red Pontiac, Cobbler and Norchip.

The three Minnesota entries were not planted in South Dakota and Michigan 709 was not planted in Kansas and Louisiana. Nebraska planted a trial at Lincoln and Alliance.

Yield. Total and U.S. No. 1 yield are reported in North Central Table 1 and 2. Wisconsin with an average total yield for all entries of 461 cwt. per acre produced the highest yield. South Dakota, Nebraska (fall), Minnesota, and Michigan also produced some high yields. North Dakota and Louisiana produced the lowest yields. Yields at Grand Forks, North Dakota were not indicative of yields of that particular area as extreme dryness coupled with severe alkaline salt injury almost caused a complete crop failure on the land that the North Dakota trial was planted.

Of the early entries, Norchip produced the highest total yield but Cobbler produced the highest U.S. No. 1 yield. In the late class, Red Pontiac and Michigan 709 were the highest yielders. No entry was extremely low in yield.

Maturity. Norland and Cobbler were the earliest maturing entries while Red Pontiac and Wisconsin 707 were the latest. Again several entries that were thought to be late were actually quite early. Lines ND6634-2R and Neb. 93.55-16 with an average of 2.5 and 2.8, respectively, were such examples. Maturity is reported in North Central Table No. 3.

Total Solids. Wisconsin 623, Neb. 52.57-1, Neb. 93.55-16 produced the highest percent total solids and Minn. 4536 along with Wisc. 707 and Red Pontiac produced the lowest percent total solids. Total solids are found in North Central Table No. 4.

Scab Reactions. Louisiana reported a very low incidence of scab while Nebraska and Michigan reported a fairly high or severe incidence of scab for some entries. The most resistant entries seemed to be Norland, Norchip, Wisconsin 717, La 71-82, Wisc. 623, and Neb. 93.55-16. Several numbered selections in trial appeared to be quite scab susceptible. (North Central Tables 5 and 6)

Internal and External Defects. A summary of defects are found in North Central Table 6. A particular weakness of a variety or selection is starred only to call it to the attention of the developer or the person responsible for the entry being in trial.

Overall Merit Ratings. Merit ratings are presented for 1971, 1972 and 1973 season.

	<u>1971</u>	<u>1972</u>	<u>1973</u>
1. Wisc. 623	x	24	30
2. (La 71-110	x	9	20
(Mich. 709	x	x	20
3. (Norland	27	5	12
(Minn. 4536	x	x	12
4. ND 6634-2R	x	x	11
5. (Cobbler	9	0	8
(Minn. 3935	x	10	8

Chip Quality. Chip quality is reported in North Central Table 8. Wisconsin 623, 707 and 717 were the best chippers and produced chips quite comparable to that of Norchip, a standard check variety. North Dakota 6634-2R, a red selection, chipped better than anticipated.

North Central Table 1. Total Yield (cwt/A).

Variety	Early	Kansas	La.	Mich.	Minn.	Late 1/ summer		No. Dak.	Ohio	So. Dak.	Wisc.	Ave.
						Neb.	Late fall					
Minn. 4536	247	165	304	397	296	393	98	162			454	279.6
Minn. 4537	276	78	356	420	297	463	106	159			473	291.3
Norland	277	118	353	397	320	352	63	242		508	402	303.2
Cobbler	361	86	419	361	358	355	91	312		534	373	325.0
Norchip	326	105	340	346	383	476	110	285		454	510	333.5
Med. to Late												
Neb. 93.55-16	251	78	335	434	261	350	96	198		367	413	278.3
Neb. 47.62-1	225	128	318	374	254	342	87	230		401	363	272.2
Neb. 52.57-1	149	112	377	346	181	405	67	167		266		230.0
La 71-82	194	124	281	326	221	320	78	311		348	362	256.5
La 71-110	288	103	405	419	332	455	87	285		396	502	327.2
La 91-157	256	110	267	415	202	426	88	298		396	517	297.5
Mich. 709			359	442	365	396	72	359		414	472	359.9
Wisc. 623	322	121	393	394	341	434	110	297		395	488	329.5
Wisc. 707	205	94	333	355	186	354	67	229		430	517	291.0
Wisc. 717	202	154	335	417	256	332	85	248		396	482	290.7
Minn. 3935	371	109	360	368	311	491	106	61			488	296.1
ND6634-2R	168	116	335	371	287	349	128	193		404	409	276.0
Red Pontiac	387	103	173	463	399	540	146	448		672	604	393.5
Average	265	112	336	391	292	402	94	249		425	461	

1/ Nebraska trials (a) planted late summer at Lincoln (April 14) and late fall at Alliance (May 22).

North Central Table 2. U.S. No. 1 Yield (cwt/A).

Variety	Early	Med.	Late	Kansas	La.	Mich.	Minn.	Late		No. Dak.	Ohio	So. Dak.	Wisc.	Ave.
								summer	fall					
Early to Med.	Early	Med.	Late					Neb.	Neb.					
Minn. 4536	197	137	294	379	101	326	91	130	444				233.2	
Minn. 4537	202	54	340	413	89	407	89	137	455				242.9	
Norland	238	88	330	368	198	260	49	224	371	402			252.8	
Cobbler	263	65	375	346	122	269	82	264	336	523			264.5	
Norchip	270	93	303	329	157	285	86	186	476	303			249.3	
<u>Med. to Late</u>														
Neb. 93.55-16	166	60	308	414	130	294	85	173	368	352			235.0	
Neb. 47.62-1	155	113	274	329	112	246	72	203	303	321			212.8	
Neb. 52.57-1	101	94	352	321	83	303	52	146		255			189.7	
La 71-82	134	127	265	307	27	259	65	237	333	301			205.5	
La 71-110	230	91	379	386	199	377	76	208	466	366			277.8	
La 91-157	196	94	271	397	81	328	80	227	499	365			253.8	
Mich. 709			344	429	197	308	68	279	461	401			310.9	
Wisc. 623	242	84	367	372	188	399	100	245	457	315			276.9	
Wisc. 707	118	84	310	325	104	279	57	179	497	288			241.9	
Wisc. 717	102	121	301	385	125	278	74	199	453	365			240.3	
Minn. 3935	262	97	336	350	115	373	98	46	455				236.9	
ND6634-2R	92	95	307	336	163	289	117	146	367	401			231.3	
Red Pontiac	326	90	162	447	128	113	130	381	580	602			295.9	
Average	194	93	312	369	129	300	82	201	431	371				

North Central Table 3. Maturity Classification. 1/

Variety	Early	Med.	Kansas	Ia.	Mich.	Minn.	Late summer		Ohio	So. Dak.	Wisc.	Ave.
							Neb.	Neb.				
Minn. 4536	3.0	2.0	2.0	1.5	3.0	3.0	3.0	1.0	2.0		1.0	2.1
Minn. 4537	3.0	2.0	2.0	1.5	3.0	3.0	3.0	2.0	2.0		2.0	2.3
Norland	2.0	1.0	1.0	1.5	2.0	2.0	2.0	1.0	2.0	1.0	1.0	1.6
Cobbler	2.0	2.0	2.0	1.5	2.0	2.0	2.0	1.0	2.0	2.0	1.0	1.8
Norchip	5.0	2.0	2.0	2.0	3.0	3.0	3.0	3.0	2.0	2.0	3.0	2.7
<u>Med. to Late</u>												
Neb. 93.55-16	4.0	2.5	2.0	2.0	4.0	4.0	4.0	2.0	2.0	1.0	3.0	2.8
Neb. 47.62-1	4.0	3.5	2.0	2.0	5.0	5.0	4.0	3.0	2.0	2.0	3.0	3.2
Neb. 52.57-1	4.0	4.0	4.0	4.0	5.0	5.0	2.0	4.0	2.0	4.0		3.6
Ia 71-82	4.0	3.5	3.5	3.5	3.0	3.0	2.0	4.0	3.0	4.0	4.0	3.5
Ia 71-110	4.0	3.5	3.5	3.5	3.0	3.0	3.0	4.0	2.0	3.0	5.0	3.5
Ia 91-157	4.0	2.0	4.0	4.0	3.0	3.0	3.0	3.0	2.0	4.0	5.0	3.4
Mich. 709			3.0	3.0	4.0	4.0	4.0	4.0	3.0	3.0	5.0	3.7
Wisc. 623	5.0	2.0	3.0	3.0	4.0	4.0	3.0	3.0	2.0	3.0	4.0	3.2
Wisc. 707	5.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	5.0	4.0
Wisc. 717	4.0	2.0	4.0	4.0	4.0	4.0	3.0	5.0	4.0	3.0	5.0	3.8
Minn. 3935	5.0	2.0	2.0	2.0	3.0	3.0	3.0	2.0	4.0		3.0	3.0
ND6634-2R	2.0	2.5	2.0	2.0	3.0	3.0	2.0	2.0	2.0	3.0	3.0	2.5
Red Pontiac	5.0	3.5	5.0	5.0	5.0	5.0	4.0	3.0	2.0	4.0	4.0	4.0

1/ 1 = very early--Norland maturity

2 = early--Irish Cobbler maturity

3 = medium--Red Pontiac maturity

4 = late--Katahdin maturity

5 = very late--Kennebec or Russet Burbank maturity

North Central Table 4. Total Solids.

Variety	Early	Kansas	La.	Mich.	Minn.	Late		No. Dak.	Ohio	So. Dak.	Wisc.	Ave.
						summer Neb.	fall Neb.					
Minn. 4536	11.4	18.2	15.8	19.4	15.2	17.3	18.6	13.9			16.2	16.2
Minn. 4537	13.3	18.8	16.5	19.2	14.5	17.7	18.8	14.4			16.7	16.7
Norland	14.1	16.5	16.2	16.2	16.2	16.5	18.8	14.5		17.8	15.8	16.3
Cobbler	16.5	18.6	17.5	19.9	18.6	19.0	19.4	16.1		20.2	18.8	18.5
Norchip	17.1	18.6	20.1	21.4	18.4	18.8	19.7	18.6		20.8	20.5	19.4
<u>Med. to Late</u>												
Neb. 93.55-16	17.1	19.2	20.5	23.3	18.2	19.0	20.3	17.7		21.2	18.4	19.5
Neb. 47.62-1	15.6	19.9	19.9	20.5	18.8	19.9	19.9	18.0		19.7	19.2	19.1
Neb. 52.57-1	16.7	20.3	21.2	22.4	18.2	18.4	18.6	17.9		21.1		19.4
La 71-82	13.9	18.6	17.3	19.4	16.5	18.4	16.9	15.9		18.9	17.1	17.3
La 71-110	12.7	19.2	18.0	18.2	14.8	17.7	17.1	16.6		18.4	17.1	17.0
La 91-157	13.3	18.4	18.0	20.5	17.7	17.7	18.4	16.0		19.1	18.4	17.8
Mich. 709			18.6	19.7	17.1	18.8	18.6	16.7		19.3	18.2	18.4
Wisc. 623	17.7	18.6	20.1	21.8	10.4	18.8	20.5	18.1		20.6	20.3	19.6
Wisc. 707	13.5	18.8	18.4	20.1*	15.2	19.0	16.5	16.1		18.4	17.3	16.3
Wisc. 717	15.8	20.3	19.9	21.2	19.0	19.7	18.4	17.7		20.8	19.9	19.3
Minn. 3935	15.2	17.7	17.3	20.9	15.2	17.3	18.6	16.5			18.0	17.4
ND6634-2R	13.9	16.7	17.3	19.2	15.4	18.0	19.0	14.3		17.8	17.1	16.9
Red Pontiac	13.3	18.0	16.2	17.7	14.3	19.2	15.0	15.7		17.8	17.5	16.5
Average	14.8	18.0	18.3	20.1	16.8	18.4	18.5	16.4		19.5	18.0	

North Central Table 6. Summary of Grade Defects.

Variety	External					Internal					
	Early to Med.	Early	Scab	Growth Cracks	Second Growth	Sun Green	Total 1/ Free of Ext. Def.	Hollow Heart	Internal Necrosis	Vascular Discolora- tion	Total 1/ Free of Int. Def.
Minn. 4536			20.0*	11.1*	11.1*	0.6	64.9	0.4	2.2	9.0*	87.4
Minn. 4537			20.8*	6.3	11.1*	0.8	70.4	0.0	4.7	8.0*	84.3
Norland			5.6	4.4	5.0	1.8	85.2	0.7	0.0	0.0	98.8
Cobbler			9.1	1.8	11.4*	3.1	72.8	6.9*	2.9	5.9	85.3
Norchip			4.4	10.4*	14.8*	4.3	72.6	2.8	1.1	1.3	93.4
<u>Med. to Late</u>											
Neb. 93.55-16			3.8	1.7	8.1	3.3	82.5	7.4*	6.0*	4.7	84.7
Neb. 47.62-1			11.6	3.3	7.0	2.6	79.3	3.6	3.9	4.7	87.6
Neb. 52.57-1			10.1	0.7	8.6	3.0	79.6	3.6	2.7	12.1*	81.7
Ia 71-82			2.0	0.4	13.2*	6.3*	78.0	1.2	4.8	7.8*	84.4
Ia 71-110			7.3	7.2	2.1	2.9	80.5	2.3	4.4	1.0	91.7
Ia 91-157			5.2	0.8	9.2	6.5*	80.2	3.4	20.7*	0.2	76.0
Mich. 709			11.3	1.3	8.3	3.9	77.0	1.4	0.0	1.0	96.6
Wisc. 623			5.0	4.8	6.3	2.4	82.9	0.2	0.2	2.5	96.6
Wisc. 707			14.7*	7.9	4.8	3.9	73.2	0.4	2.0	3.2	94.0
Wisc. 717			2.9	2.0	5.2	3.3	87.4	1.5	1.0	7.8*	89.4
Minn. 3935			10.9	4.5	8.1	3.4	75.4	0.0	0.9	1.0	95.4
ND6634-2R			5.9	4.7	5.9	1.1	86.3	0.0	0.0	1.6	98.0
Red Pontiac			11.2	3.7	11.2*	2.7	75.7	2.4	0.1	0.8	95.9

1/ Percent normal tubers showing no defects (some individual tubers had more than one type of defect).

* Possible weakness of a variety.

North Central Table 7. Merit Ratings 1/

Variety	Late											Total Points
	Kansas	La.	Mich.	Minn.	summer Neb.	Late fall Neb.	No. Dak.	Ohio	So. Dak.	Wisc.		
Early												
Minn. 4536		3	4	3			2				12	
Minn. 4537											0	
Norland	2	1		1	5	3					12	
Cobbler								3	5		8	
Norchip	3	2					1				6	
<u>Med. to Late</u>												
Neb. 93.55-16						1					1	
Neb. 47.62-1			3			2					5	
Neb. 52.57-1											0	
La 71-82											0	
La 71-110		5		2	3	5	4	1			20	
La 91-157											0	
Mich. 709			5	5	2			4	3	1	20	
Wisc. 623			2	4	4	4	3	5	2	2	30	
Wisc. 707	4								1	5	6	
Wisc. 717		4									4	
Minn. 3935	5									3	8	
ND6634-2R			1		1		5			4	11	
Red Pontiac	1							2	4		7	

1/ Merit Points determined as follows:

Merit Rating	Merit Points
1	5
2	4
3	3
4	2
5	1

North Central Table 8. Chip Quality.

Variety	1/ Kansas	1/ La.	2/ Mich.	2/ Minn.	Late 1/ summer Neb.	Late 1/ fall Neb.	3/ No. Dak.	2/ Ohio	2/ So. Dak.	4/ Wisc.
Minn. 4536		3.5			3	4	38			70
Minn. 4537		3.2			3	4	42			70
Norland		5.0			4	3	45			72
Cobbler	4	2.0			3	3	43			73
Norchip	1	3.0			2	2	48			83
<u>Med. to Late</u>										
Neb. 93.55-16	2	3.8			3	3	39			80
Neb. 47.62-1		8.0			2	3	34			77
Neb. 52.57-1		3.0			2	3	43			
Ia 71-82	1	2.5			2	3	43			79
Ia 71-110	2	3.0			3	4	44			72
Ia 91-157	1	2.5			3	3	46			76
Mich. 709					3	4	40			70
Wisc. 623		3.0			1	3	45			82
Wisc. 707	1	2.5			2	1	47			83
Wisc. 717	1	1.6			1	2	47			86
Minn. 3935		4.3			3	3	43			70
ND6634-2R		3.0			1	3	49			78
Red Pontiac		2.0			4	3	34			70

1/ PCL1 Chip Color Chart (the lower the number the lighter the chip color).
Mini-fry method was also used.

2/ No data.

3/ Agrtron (the higher the number the lighter the chip color).

4/ Chip Score--70 = very dark
90 = very light
80 or more = acceptable color

ALABAMA

J. L. Turner, Harrison Bryce and Hubert Harris - Auburn University
Frank E. Garrett - Gulf Coast Substation
Marlin H. Hollingsworth - North Alabama Horticulture Substation
S. E. Gissendanner and John Eason - Sand Mountain Substation

Irish Potato Variety Trial, Sand Mountain Substation
Crossville, Alabama

Experimental Procedure. Seven named varieties and 35 numbered lines were grown this year for yield trials. Lines were from Frito-Lay Company, Louisiana, Wisconsin, and USDA. Each entry was replicated 4 times in 20-foot plots. Seedpieces were cut to approximately $1\frac{1}{2}$ ounces each, treated for rot control, and planted on March 23. Planting conditions were wet, and soil preparation was not ideal. Basic Slag at 1000 pounds per acre was applied the fall of 1972. Fertilizer was applied as 600 pounds of 5-15-30 drilled to each side of the row at covering. Sidedress was 300 pounds of NH_4NO_3 30 days after planting. Plots were dug July 12. Samples were returned to Auburn for laboratory analysis.

Results. Yields were not good this year. Excessive rainfall occurred during the growing season and resulted in some rotting. Red LaSoda and Wisconsin 66-BR-72 were good red potatoes this year. The two highest yielding entries were B7139-4 and B6495-12. Both are white and show some russet. Eye appeal varied but was lowest for the USDA entries. Additional data is shown in Table 1.

Potato properties are presented in Table 2. Specific gravity was highest for B6987-56. Several others were also high. Chip weight was highest for B6987-43. Chip color rating was highest for B6503-2 and B6516-26. Frito-Lay 657 was also high in chip color.

Alabama Table 1. Potato variety trial, Crossville, Alabama 1973

Variety	Yield Per Acre		Total Cwt.	Eye depth		Eye Size	Skin Color	Shape	Eye Appear
	No. 1 Cwt.	No. 2 Cwt.		1/	2/				
Kernalee	74.34	20.64	94.98	S	S		Wh	Long	4
Laurel Super	40.54	19.46	60.00	S	S		Wh	Round	3
Neoclip	19.48	11.23	30.70	S	S		Wh	Round	3
Rainbow	40.30	7.65	47.95	S	S		Wh/RR	Round	4
Red Landada	100.03	23.06	123.09	D	L		Red	Round	4
Superior	50.47	11.05	61.52	M	S		Wh/RR	Round	4
Florida Jay 83	64.93	34.97	99.90	D	L		Wh/RR	Round	3.5
Florida Jay 160	62.54	20.27	82.81	S	S		Wh/RR	Round	4
Domino 16	50.94	11.43	62.37	S	S		Wh/RR	Round	4
Florida Jay 657	60.33	17.30	77.63	S	S		Wh	Rd. Long	4
Florida Jay	55.91	25.90	81.80	S	S		Wh/RR	Long	3.5
Florida Jay	62.97	21.61	84.58	D	M		Wh	Round	4
Wima 603	50.20	43.60	93.80	S	S		Wh	Round	3
Wima 60-13R-72	121.70	19.40	141.10	D	L		Red	Round	4
Wima 604	71.95	24.63	96.58	M	M		Wh/RR	Round	4
Wima 604	24.00	25.33	49.33	S	S		Wh	Round	3
Wima 604	64.30	19.33	83.63	S	S		Wh/RR	Round	4
Wima 617	65.71	24.90	90.60	S	S		Wh/RR	Round	3
Wima 618	25.15	20.30	45.45	S	S		Wh/RR	Rd. Long	3.5
Neoclip 12	101.03	41.21	142.24	S	S		Wh/RR	Long flat	2.5
Neoclip 2	71.15	24.13	95.28	S	S		Wh/RR	Long flat	3
Neoclip 20	101.03	24.13	125.16	S	S		Wh	Long flat	2.5
Neoclip 12	103.05	10.30	113.35	M	M		Wh	Rd. Long	3
Neoclip 24	62.30	19.33	81.63	S	S		Wh	Rd. Long	3
Neoclip 33	70.94	30.22	101.16	S	S		Wh/RR	Round	3.5
Neoclip 3	53.07	21.40	74.47	M	M		Pink	Round	2.5
Neoclip 43	55.33	25.70	81.03	S	S		Wh/RR	Round	2.5
Neoclip 20	112.92	25.44	138.36	M	M		Wh/RR	Round	3
Florida Jay	53.33	15.33	68.66	S	S		Wh	Rd. flat	3.5
Florida Jay	64.70	25.37	90.07	S	S		Wh	Round	2.5
Florida Jay	50.33	25.40	75.73	D	M		Wh/RR	Rd. Long	2.5
Florida Jay	132.01	15.75	147.76	M	M		Wh/RR	Rd. Long	3.5
Florida Jay	112.30	43.00	155.30	S	M		Wh/RR	Rd. flat	4
Florida Jay	105.40	25.33	130.73	S	S		Wh	Rd. Long	3
Florida Jay	60.03	15.63	75.66	S	S		Wh	Round	3
Florida Jay	54.00	20.70	74.70	S	S		Wh	Round	2.5
Florida Jay	42.40	15.33	57.73	S	S		Wh. Russet	Round	3.5
Florida Jay	60.33	23.37	83.70	S	S		Wh	Long flat	3
Florida Jay	77.00	20.70	97.70	S	M		Wh	Long flat	3
Florida Jay	50.70	20.30	71.00	S	S		Wh	Round	2.5
Florida Jay	50.80	13.20	64.00	S	S		Wh	Rd. flat	2.5
Florida Jay	59.30	11.00	70.30	S	S		Wh	Rd. flat	3.5

1 S = Small; M = Medium; D = Deep

2 S = Small; M = Medium; L = Large

3 RR = Russet; WH = White

4 L = Long; R = Round

Alabama Table 2. Quality and processing evaluations of potato varieties and breeding lines, Crossville, Alabama 1973 1/

Variety	Raw tuber properties 2/		Potato chip properties 3/	
	Specific gravity	Total solids	Chip weight	Chip color
	1.0 omitted	Pct.	grams	7.8
Kennebec	722	18.5	152.4	7.8
LaChipper	693	17.7	164.3	7.8
Horchip		19.6	154.9	8.8
Raritan		21.3	160.4	7.0
Red LaBoda	651	17.0	137.6	5.3
Superior	705	19.5	147.6	7.8
Frito Lay 96	737	18.7	147.1	8.3
Frito Lay 162	763	19.4	151.5	8.5
Frito Lay 242	843	21.4	160.7	7.8
Frito Lay 657	739	19.0	150.0	9.0
B71-82	675	17.2	143.6	8.3
B71-110	626	16.5	135.7	7.5
Win. 623	710	18.3	142.4	8.5
Win. 66-13R-72	760	19.3	143.0	5.0
Win. 703	773	19.8	153.9	8.0
Win. 704	637	17.8	153.5	7.8
Win. 707	704	17.2	141.2	6.8
Win. 717	642	17.3	166.5	8.3
Win. 743	700	18.1	162.9	8.0
B649-12	734	19.9	169.2	8.0
B650-2	870	21.6	167.6	9.5
B6516-26	865	21.6	171.5	9.5
B657-12	662	17.3	151.9	6.0
B675-24	835	20.9	161.7	8.5
B675-33	832	21.9	167.3	8.5
B677-9	709	18.3	155.1	7.3
B677-43	795	20.0	175.3	8.3
B677-56	931	22.3	164.2	8.3
B713-14	774	19.7	143.0	7.5
B713-25	844	21.2	146.0	7.8
B713-13	840	20.1	164.7	8.0
B713-4	807	20.2	160.6	8.3
B720-4	706	18.2	154.9	4.8
B762-3	729	18.3	156.4	6.0
B764-5		16.4	159.9	8.3
B764-2	743	19.1	153.2	8.3
B767-2	769	19.3	164.0	6.8
B769-3	729	18.2	133.5	5.5
B769-1	823	20.3	164.1	8.0
B775-5		18.7	163.3	4.8
B776-2	730	19.3	163.3	7.8
B776-3	762	18.4	162.3	5.0

1/ Data are means from potatoes dug July 13 and stored at 75° F for approximately two weeks before processing.

2/ Determined by standard specific gravity method. (vacuum oven on samples less than 3 lbs.)

3/ Weight of chips from 454 grams prepared slices (washed, friction peeled, sliced 1/30", washed, centrifuged, fried 2.5 to 3 min. 370° F down to 325° F, drained).

4/ Based on scale of 1 as very dark and unacceptable to 6 as barely acceptable to 10 as very bright and highly acceptable.

ALASKA

Curtis H. Dearborn

Emphasis in hybridizing was placed on parental lines that: possess high frost tolerance; develop tubers rapidly and set tubers deep in the soil. Volume of seed obtained indicated that compatability was poor.

Among the new selections made in 1973, 20 clones exhibited high tolerance to field frosting in September.

Clone Ak. 3-58-35-68, a selection from the cross Ontario X Stately was named Snowchip and released to potato growers.

Bitterness was detected in several new clones whose parentage involved B-5141-6. Some produced the sensation at the tip of the tongue, some at the base of the tongue, but most irritated or burned the throat. Soil conditions have been found that induced high TGA content in some clones containing B-5141-6.

In the search for potato clones with russet skins, many russeting variations have been noted. In the Cook Inlet region, the plate-like pattern of Russet Burbank tubers never envelops the entire tuber and generally no plate-like surface structure is apparent. Instead, the tubers have a fine russet surface that may cover the entire tuber but usually it does not. The bud-end may be free of russeting for as much as one-third of the total surface of the tuber. The 1973 crop russeted in this manner and of course, Russet Burbank tubers bore only a slight resemblance to the variety as grown in the other states.

In the same planting, seedlings from crosses designed to produce russet-skinned potatoes did produce dark brown russet tubers with plate-like surfaces. Some of these seedling russet clones developed the plate-like pattern on the basal two-thirds of the tuber and no russeting on the remaining one-third. Some of this material is available for study at other locations if any one requests it.

In a replicated variety test of 66 clones harvested 130 days from planting, clone Ak. 11-68-4-71 produced 378 hundred weight of U. S. No. 1 tubers with a specific gravity of 1.093. A red-skinned clone, 18-69-6-71 averaged 368 cwt. with specific gravity of 1.082. Kennebec in the same test produced 360 cwt. with 1.087 specific gravity. Nooksack contributed to high yields in several crosses including clone Ak. 11-68-4-71.

In an Early Harvest, 100 days from planting, test of ten commercial varieties and 56 coded selections, Kennebec produced 250 cwt. per acre with specific gravity of 1.084, and was exceeded by five other clones. The highest yield in the test was 313 cwt. produced by the red-skinned clone mentioned above.

Frying tests on tubers conditioned for three weeks at 70° F indicate that composition of the pith region has more influence on capacity to produce light chips than does the cortical region of the tuber.

COLORADO

J. A. Twomey and J. A. Maga

Potato Seedlings and Varietal Evaluation

Seedling Program. Approximately 12,000 first-year seedlings were planted May 7 and 8, 1973. Seedlings were obtained from Dr. William G. Hoyman and Dr. Raymon Webb from their respective breeding programs in Prosser, Washington, and Beltsville, Maryland. The primary goal of this project is to select long russet types superior to the presently grown Russet Burbank variety. Selection of promising white potatoes for chipping and red potatoes for fresh market use are a secondary part of the program.

Seedlings were harvested the first week in September. At harvest, 214 first-year seedlings were selected for further testing and evaluation. From 273 advanced seedlings grown in 1973, 54 were selected for increase and evaluation in 1974. Six selections, WC285-18, WC285-83, WC285-141, WC285-146, WC230-14, and DT6063-1R, have been released to Colorado foundation seed growers for increase and evaluation on a commercial basis.

Yield Trials. At the San Luis Valley Research Center, 20 advanced seedlings and named varieties were included in the 1973 yield trial. This trial was planted on May 14 and harvested September 19. Plots were planted on spring-plowed alfalfa land in 34-inch rows with 12-inch spacing in the row. Each selection was replicated four times in the trial. Fertilizer (18-46-0) was applied four inches below the seedpiece at planting time at the rate of 450 pounds per acre. The yield and grade for each selection may be found in Colorado Table 1.

Yields of marketable potatoes and total yields were somewhat lower than in 1972, which may be partially attributed to a frost on June 9 and higher than normal temperatures in late June and early July.

A new seedling, WC304-4, was outstanding in this trial and will be increased and observed again. Most russet selections were superior to Russet Burbank.

In northern Colorado, Mr. Charles Urano, Extension Vegetable Specialist, planted yield trials on the Schafer farm and the Northern Colorado Research and Demonstration Center. Data for these trials may be found in Colorado Tables 2 and 3, respectively.

Since the Russet Burbank variety is not grown in northern Colorado to any great extent, it was not included in this trial. Line WC304-4 was the most promising selection in both trials and appears to be well adapted for northern Colorado.

Laboratory Evaluation. Dr. J. A. Maga, Assistant Professor of Food Science and Nutrition, conducted numerous laboratory tests to determine qualities which may directly or indirectly influence consumer acceptability. Tests conducted included change in pH during cooking, weight loss under home storage conditions, weight loss during baking, and sensory evaluation.

Colorado Table 4 summarizes the data from a 20-member sensory panel which evaluated the whole potato appearance, interior color, moisture, texture, odor, and flavor of 18 selections. Selection WC230-14 has consistently rated high in all previous sensory evaluations and appears to have consistent culinary qualities.

A colorimetric procedure was used to determine glycoalkaloid content of all selections, with B5141-6 used as a control. These data are presented in Colorado Table 5.

Colorado Table 1. Yield and Grade for 1973 Variety Trial at San Luis Valley Research Center.

Selection	Yield Per Acre							
	U.S.No. 1		U.S.	B Size		Total	U.S.	
	4-10 oz.	>10 oz.	No. 2	Culls	<4 oz.	Total	No. 1	
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Pct.	
WC285-141*	167.3	70.4	14.9	12.5	24.9	290.0	237.7	82.0
WC285-146*	237.1	22.8	11.7	5.5	61.3	338.4	259.8	76.8
WC285-83*	149.8	32.1	15.6	5.5	36.1	239.1	181.9	76.0
WC285-18*	234.6	34.8	8.2	8.2	70.1	355.9	269.3	75.7
WC230-14*	152.1	35.4	13.4	7.5	57.6	265.9	187.5	70.3
Nooksack*	103.1	84.7	17.5	11.0	27.1	243.4	187.8	77.2
BC7222-5†	268.5	38.5	11.4	8.1	69.9	396.4	306.9	77.4
BC7163-2†	174.8	58.9	25.0	12.5	45.9	317.1	233.7	73.7
WC314-2*	174.0	34.8	16.4	11.5	43.7	280.4	208.8	74.4
WC325-1†	178.3	60.9	18.4	8.7	22.9	289.1	239.1	82.7
WC304-4*	158.9	127.1	24.7	12.3	33.2	356.2	286.0	80.2
WC300-4*	215.4	27.1	13.4	9.3	82.1	347.3	242.5	69.8
WC315-1*	169.5	18.0	20.5	8.1	59.8	275.9	187.5	68.0
WC316-1*	175.9	55.7	16.4	8.3	37.6	294.4	231.6	78.6
DT6063-1R‡	164.9	206.1	23.1	5.3	27.5	426.7	370.8	86.8
UX123-4-2‡	246.6	46.7	13.6	11.8	59.9	378.6	293.3	77.4
67-64-6‡	276.6	142.1	5.4	5.9	28.9	358.9	318.7	88.8
R. McClure‡	257.0	34.9	42.9	28.7	92.9	456.3	291.9	64.0
R. Burbank*	135.1	52.2	31.5	36.1	43.8	298.7	187.3	62.7
Oromonte†	286.0	28.7	21.1	10.1	106.4	452.3	314.7	69.6
LSD .05	25.5	27.7	8.8	8.2	11.0	38.8	37.0	
LSD .01	34.1	37.0	11.7	10.9	14.7	51.8	49.3	

*Long Russet Potatoes

†White Potatoes

‡Red Potatoes

Colorado Table 2. Yield and Grade for Seedling and Variety Trial on the Schaefer farm.

Selection	Yield Per Acre					Total No. 1s Cwt.
	U. S. No. 1		Culls	B Size <4 oz.	Total Yield Cwt.	
	4-10 oz.	>10 oz.				
	Cwt.		Cwt.	Cwt.		
WC230-14	152.6	95.2	42.7	11.7	302.2	247.8
WC304-4	168.2	164.8	32.8	8.2	373.9	333.0
Targhee	154.6	71.3	23.0	18.1	266.9	225.9
WC285-146	222.0	35.3	22.6	20.3	312.9	257.3
Nampa	179.0	38.5	39.7	21.2	278.6	217.5
WC315-1	131.6	35.6	12.5	14.9	194.5	167.2
Nooksack	103.8	65.0	26.6	7.8	198.8	168.8
WC283-8	173.3	25.2	15.8	26.4	240.5	198.5
WC325-1	106.3	74.1	32.4	11.8	224.4	180.4
WC316-1	166.8	124.6	28.8	9.3	329.3	191.4
WC314-2	195.2	62.0	37.4	19.9	314.3	257.2
WC285-83	150.2	58.5	20.2	10.9	239.6	208.7
WC285-141	170.5	87.6	27.6	11.6	297.1	258.1
WC285-18	183.1	48.7	16.9	28.6	277.2	231.8
WC300-4	192.6	41.4	14.4	21.7	270.0	234.0

Colorado Table 3. Yield and Grade for Seedling and Variety Trial at the Northern Colorado Research and Demonstration Center.

Selection	Yield Per Acre					Total No. 1s Cwt.
	U. S. No. 1		Culls	B Size <4 oz.	Total Yield Cwt.	
	4-10 oz. Cwt.	>10 oz. Cwt.				
WC230-14	172.2	104.2	9.9	13.1	299.4	276.4
WC304-4	165.0	181.3	9.5	13.1	368.3	346.3
Targhee	167.1	58.1	6.6	14.7	247.1	225.2
WC285-146	227.1	40.5	5.4	14.1	286.9	267.6
Nampa	153.6	27.5	51.6	20.3	253.0	181.1
WC315-1	172.9	49.8	9.1	19.5	250.8	222.7
Nooksack	122.0	75.2	24.9	6.4	228.6	197.2
WC283-8	123.4	35.0	8.6	21.7	187.6	158.4
WC325-1	103.1	87.1	15.1	6.6	211.8	190.2
WC316-1	145.8	79.0	5.0	9.0	239.0	224.8
WC314-2	198.5	79.2	12.4	18.1	308.1	277.7
WC285-83	106.6	65.0	13.0	7.2	171.8	171.6
WC285-141	159.6	78.2	26.6	7.0	271.2	237.8
WC285-18	237.8	55.6	3.1	32.7	329.2	293.4
WC300-4	265.8	63.9	7.4	21.9	359.3	329.7

Colorado Table 4. Sensory Panel Potato Rankings*.

Sample		Total Score**
WC345-15	(Overall Best)	127.6
Red McClure		125.3
WC230-14		125.0
67-64-6		123.9
Russet Burbank		123.3
WC300-4		120.1
DT6063-1R		119.8
WC325-1		113.1
WC304-4		109.8
WC285-141		105.3
B7679-4		102.6
WC304-4		98.2
WC285-18		97.9
WC316-1		95.6
WC285-83		93.1
W168-3 (Nooksack)		92.7
WC285-146		89.3
B5141-6	(Overall Poorest)	83.1

*Based on whole potato appearance, interior color, moisture, texture, odor and flavor.

**Out of a possible 162 total points.

Colorado Table 5. Total Glycoalkaloid Content in Potato Peels.

Sample	mg/100 g. Fresh Tissue	Lowest to Highest Concentration
WC304-4	14.0	7
W168-3 (Nooksack)	14.0	7
WC300-4	23.2	11
WC285-141	10.0	3
WC285-146	16.0	9
WC316-1	12.8	6
WC285-18	10.0	3
WC285-83	12.8	6
WC325-1	11.2	4
67-64-6	16.8	10
WC314-2	12.0	5
WC345-15	8.0	1
B7679-4	10.0	3
B5141-6	28.8	12
WC230-14	14.9	8
DT6063-1R	10.0	3
Russet Burbank	9.2	2
Red McClure	14.9	8
WC345-14	23.2	11

CONNECTICUT

Arthur Hawkins

Potato Variety and Seedling Test in Connecticut - 1973

The 1973 potato variety test was conducted on a commercial potato farm in the Connecticut River Valley, on the same field as in 1971 and 1972. A complete fertilizer was applied in sidebands as the rows were furrowed out.

Following heavy rains after planting, an additional 45 lbs. of nitrogen per acre was topdressed prior to final hilling. Ample rainfall until mid-August but high temperatures and low rainfall during the latter part of August and early September were unfavorable for high yields and dry matter.

Seed was supplied by the USDA National Potato Breeding Program from Presque Isle, Maine, except Hudson from Cornell, and Bounty and Norchief from Minnesota.

Plots were single rows, 21 feet, replicated four times. Experimental procedures, total yields, yields over 1-7/8" with seriously off-shaped tubers removed, specific gravity, and chip color are given in Connecticut Table 1. Soil tests and fertilizer rates are also given in the footnotes.

Yields. Highest yield over 1-7/8" and free of off-shape was produced by B6567-12, followed by Hudson, Norchip, Abnaki, and Chieftain with higher yields than Katahdin; and relatively low yields by Norland, Norchief and B5603-3.

Specific Gravity. High temperatures during the latter part of the growing season were not favorable for high specific gravity readings. Highest specific gravity was produced by B5063-3, Norchip, B6567-12, Abnaki, Hudson; followed by Norchief and Oramonte, then Katahdin, Cascade and Chieftain, with Norland the lowest.

Chipping Quality. Following harvest 10/9/72, potatoes were stored in farm storage at about 45° F until graded 11/19/73; then placed in a controlled storage at 50° F until storage temperature was raised to 70° F 1/19/74 until chipped 2/20/74.

Oramonte, Abnaki and Norchip were superior in lighter colored chips to other varieties; followed by Katahdin, Hudson, Norchief. Chips of Cascade, Norland and B6567-12 were on the darker side and Chieftain very dark.

Comment on B6567-12 tested for three years. Line B6567-12 outyielded all varieties tested including Hudson in 1972 and 1973. In the three years 1971, 1972, 1973, B6567-12 produced 539, 478, and 365 cwt/A of marketable potatoes 1-7/8 - 4" with off-shape removed, compared with Katahdin at 474, 354 and 248 cwt/A, respectively.

Specific gravity of B6567-12 was superior to Katahdin in 1971 and especially in 1973. Maturity in Connecticut was about the same as Katahdin to slightly earlier.

Connecticut Table 1. Yield^{1/}, specific gravity, and chip color of potato varieties and seedlings - Connecticut, 1973^{2/}

Variety or seedling ^{3/} Spacing 9" except as noted	Total yield per acre	<u>Yield per acre over 1-7/8"</u>				Specific gravity ^{5/}	Chip color ^{6/} 2/20/74
		<u>Free of off-shape^{4/}</u>					
	Cwt	%	Cwt	%	Cwt	1.0+	
Abnaki (8")	334	95	318	95	317	71	6.6
Bounty(R)	257	84	214	83	213	63	7.4
Cascade	256	83	212	82	210	67	7.7
Chieftain(R)	295	92	271	91	269	60	9.0
Hudson (8")	348	94	328	94	328	70	7.2
Katahdin	273	91	249	90	248	63	7.0
Norchief(R)	198	83	164	82	163	68	7.3
Norchip(10")	335	90	302	88	295	74	6.7
Norland(R)	208	85	176	85	176	52	8.0
Oramonte	239	82	196	79	190	67	5.9
B5603-3(R)	218	83	180	83	180	79	7.3
B6567-12	385	95	366	95	365	72	8.0

1/ Plots: 1 row 21 feet; rows 35" apart. Replication: four in randomized blocks (each 4 sections x 4 rows) not damaged by sprayer wheels. Soil: Narragansett silt loam; potatoes 1971 and 1972, shade tobacco previous several years; pH 5.5; available soil test P = H; K = H; Mg = M. Fertilizer: 2600 lbs 8-10-10-3 per acre sidebanded at planting. Following heavy rains May and June additional 45 lbs N per acre topdressed.

2/ Season and conditions: So. Windsor, 12 miles N.E. of Hartford. Planted: 5/1/73. High rainfall in May; ample rainfall until mid-August. Control of insects good until late in season. High temperature and dry latter part of August and early September. Longer-season varieties finished by September 25, by Colorado beetles.

3/ Seed cut 1-1/2-2 oz.; spaced 9" apart except as indicated. (R) = red skin.

4/ Off-shaped tubers: Oramonte 2.6%, Norchip 2.3%.

5/ Specific gravity: Average of 4 replicates; tubers 2-1/2-3"; 5 to 7 lb samples, weight in air and water method.

6/ Harvested: 10/9/72. Storage: Farm storage about 45° F until 11/19/73, then stored at 50° F. Specific gravity run 1/7/74. Storage temperature raised to 70° F on 1/19/74. Chipped on 2/10/74. Chip color: Average of 20 chips, 10 from each of 2 replicates. Chips 6.0 and 7.0 light; 8.0 acceptable; higher reading, darker chip.

DELAWARE

R. F. Stevens, Francis Webb, U. S. Washington and Edward R. Jones^{1/}

Potato Varieties and Seedling Performance at Dover, Delaware 1973

Ten different varieties and seedlings were planted at Delaware State College, Dover, Delaware, on April 17, 1974. Fertilizer was applied in bands at planting time at the rate of 1,650 pounds of 10-10-10 per acre. Row spacing was 36" and planting in the row was eight inches and ten inches.

Irrigation was applied at the standard rate (usual rates and timing carried on by growers in the area) and a high rate of irrigation which included two more applications.

Harvests were made July 31, 1973, August 9, 1973, August 17, 1973, August 27, 1973 and September 7, 1973.

In the population studies, the low population plots were planted with seed-pieces spaced eight to ten inches apart and the high population six to eight inches apart.

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Delaware Table 1. Performance of 10 Potato Varieties and Clones

<u>Clone or Variety</u>	<u>Comparative Maturity^{1/}</u>	<u>Yield cwt/A</u>	<u>Chip Color Rating^{2/}</u>	<u>Specific Gravity^{3/}</u>
Penn 71	2	273.2	B	1.063
Haig	1	254.7	C	1.062
Penn 6 RF-1	4	109.7	C	1.063
Superior	1	216.0	C	1.062
B-6739-2	2	225.2	B	1.064
B-6987-22	1	168.4	C	1.065
B-6692-1	3	219.4	C	1.070
B-7621-2	2	290.2	C	1.061
Iopride	3	237.2	C	1.060
B-7155-3	3	217.4	D	1.060

^{1/} Determined by 5 Harvests in July, August, and September - Comparative Maturity 1 = earliest, 5 = latest

^{2/} Average of 4 samples - Chip color ratings A = Excellent B = Good
C = Fair D = Poor and Unsatisfactory

^{3/} Average of 5 samples

Delaware Table 2. Effect of the Amount of Irrigation on the Yield and Quality of Four Varieties at Average Spacing

<u>Variety</u>	<u>Amount of Irrigation^{1/}</u>	<u>Yield cwt/A</u>	<u>Specific Gravity</u>	<u>Chip Color Rating^{2/}</u>
Penn 71	Low	228.2	1.063	C
Penn 71	High	287.4	1.060	B
Haig	Low	273.8	1.065	C
Haig	High	182.4	1.061	C
Penn 6 RF-1	Low	144.2	1.063	D
Penn 6 RF-1	High	83.8	1.062	D
Superior	Low	335.8	1.063	B
Superior	High	171.8	1.062	D

^{1/} See text for explanation

^{2/} Average of 5 samples - Chip color ratings A = Excellent B = Good
C = Fair D = Poor and Unsatisfactory

Delaware Table 3. Effect of Plant Population on Yield and Quality at Average Irrigation

<u>Variety</u>	<u>Plant Population^{1/}</u>	<u>Yield cwt/A</u>	<u>Specific Gravity</u>	<u>Chip Color Rating^{2/}</u>
Penn 71	Low	228.2	1.063	C
Penn 71	High	264.6	1.062	B
Haig	Low	273.8	1.065	C+
Haig	High	305.0	1.062	C+
Penn 6 RF-1	Low	144.2	1.066	D+
Penn 6 RF-1	High	140.8	1.062	C
Superior	Low	316.6	1.063	B+
Superior	High	335.8	1.061	D

1/ See text for explanation

2/ Average of 5 samples - Chip color ratings A = Excellent B = Good
C = Fair D = Poor and Unsatisfactory

FLORIDA

J. R. Shumaker and D. P. Weingartner

Variety and Seedlings Trials

Methods. Potato varieties and seedlings were tested for desirable horticultural characteristics at the Agricultural Research Center, Hastings, Florida, in replicated intermediate and observational trials. Two-ounce seedpieces were planted by hand in late January and early February on Rutledge fine sand following a sorghum cover crop. A total of 2500 pounds of 6-8-8 fertilizer per acre was banded on each side of the row just prior to planting. Seedpieces were spaced 12 inches apart within a row with 40 inches between rows. Plots were a single row 20 feet long. Cultural practices recommended for the area were followed throughout the growing season. Tubers were stored at an average temperature of 70° F and relative humidity of 50 percent during these evaluations.

Conditions. Wet conditions prevailed during most of the growing season. Severe reduction in tuber quality was observed in most stocks and attributed to incidence of corky ringspot disease confounded with soil fungi such as Rhizoctonia spp.

Replicated Trials. Eleven named varieties, 15 seedlings and Sebago, the standard variety to northeast Florida, were replicated four times (Florida Table 1). LaChipper, Wauseon, Pungo, Seminole, Norchip, Superior and nine seedlings were equal to or better than Sebago in yield, specific gravity, and chip color. Tubers from Pungo, Superior, and seedlings B7629-1 and B7200-26 showed high degrees of resistance to both internal necrosis associated with corky ringspot disease and other surface defects.

Intermediate Trials. White skin, russet and golden nematode-resistant clones were replicated two times. Standard varieties were planted so that each clone on trial was either flanked by or only two rows removed from the check. Golden nematode-resistant clones were planted in order to observe possible resistance to southern root-knot nematodes (Meloidogyne incognita). However, nematode populations and infestations of tubers were insufficient to draw a valid conclusion. Florida Table 2 summarizes these results.

Observational Trials. Florida Table 3 summarizes the results of single plot observational trials. Several of these seedlings will be incorporated into the 1974 intermediate tests.

Florida Table 1. Yield, specific gravity, and chip color results of 1973 replicated trials at Hastings, Florida

Stock	Yield		Tuber Quality		Specific Gravity	Chip Color ^{4/}
	US "A"	Total ^{1/}	External ^{2/}	Internal ^{3/}		
	Cwt/Acre					
B6987-56	217	230	4.8	9.0	1.0788	3.3
B7139-4	214	224	4.3	7.8	1.0669	4.7
LaChipper	207	218	3.8	6.3	1.0688	3.3
B7629-1	183	199	2.3	1.3	1.0714	5.2
Wauseon	181	191	2.3	3.6	1.0642	4.7
B6987-29	181	197	4.0	6.5	1.0720	2.7
B5141-6	179	191	5.0	8.2	1.0835	3.5
B6712-18	163	173	4.3	7.5	1.0824	5.2
Pungo	158	164	2.3	1.5	1.0744	3.5
NC64-C2-3	146	167	4.0	6.0	1.0679	3.7
B7154-10	131	149	4.3	4.5	1.0491	3.3
B6955-35	129	148	4.5	8.0	1.0764	3.8
Cascade	121	133	3.8	6.5	1.0676	6.5
Seminole	120	136	4.8	4.0	1.0731	3.8
B7680-3	112	144	3.8	7.0	1.0679	4.4
B6987-57	111	117	4.0	8.0	1.0628	4.7
Norchip	111	127	5.0	9.8	1.0680	4.3
Sebago (NY)	108	127	4.3	8.3	1.0633	5.8
Superior	107	123	2.3	1.3	1.0837	3.3
Peconic	102	113	3.8	5.5	1.0700	5.3
Sebago (USDA)	93	105	3.8	6.0	1.0665	4.8
Penn 71	90	100	3.5	7.3	1.0686	4.4
Red LaSoda	90	105	5.0	9.5	--	-
B7573-3	89	100	5.0	9.0	1.0692	3.7
B6987-22	88	108	4.8	8.5	1.0692	3.5
B7200-26	87	105	3.0	1.5	1.0744	3.8
F5850	86	93	4.5	8.3	1.0633	2.8
Abnaki	66	79	4.8	6.8	1.0621	6.7
LSD .05	61	---	0.9	2.4	--	-

^{1/} Includes both marketable and culls, size A and B.

^{2/} External tuber quality 1 = excellent 5 = poor.

^{3/} Internal tuber quality 1 = excellent 10 = poor.

^{4/} Chip color values are based: 1-4 = acceptable color; 5 = borderline; and 6-14 = color too dark for use.

Florida Table 2. Results of 1973 intermediate seedling trials.^{1/}

Stock	Yield		External ^{3/} tuber quality
	US"A"	Total ^{2/}	
<hr/>			
<u>White Clones</u>	<u>Cwt/A</u>		
B6951-1	148	171	2.0
B6951-5	74	96	4.5
B6955-8	80	101	5.0
B6955-24	53	74	5.0
B6969-2	169	178	2.0
B6987-1	117	130	5.0
B6987-2	31	41	5.0
B6987-43	58	77	5.0
B6987-54	69	81	3.5
BR7106-5	63	75	4.0
BR7051-3	86	95	5.0
B7139-6	52	69	4.0
B7141-1	54	67	5.0
B7149-4	163	202	3.5
B7151-4	77	91	5.0
B7152-1	152	176	2.0
B7152-3	33	52	5.0
B7152-12	65	87	4.5
B7152-14	67	94	4.7
B7153-29	66	88	3.0
B7153-30	63	91	5.0
B7154-6	78	108	4.0
B7155-51	90	122	4.5
B7155-56	97	139	3.5
B7158-1	112	133	4.5
B7158-35	98	131	4.0
B7160-4	19	42	3.0
B7165-6	148	174	4.5
B7165-8	34	48	4.0
B7167-9	72	91	5.0
B7167-26	80	93	5.0
B7167-30	86	98	5.0
B7190-2	99	113	5.0
B7572-2	31	44	5.0
B7572-4	103	117	3.0
B7573-3	55	74	5.0
B7584-8	87	103	5.0
B7585-5	59	69	4.0
B7589-9	83	135	5.0
B7590-1	42	57	5.0
B7592-1	98	120	4.5
B7602-1	80	93	4.5

Florida Table 2. (continued)

Stock	Yield		External ^{3/} tuber quality
	US"A"	Total ^{2/}	
	Cwt/A		
B7602-2	58	76	5.0
B7617-1	48	61	5.0
B7620-4	123	137	4.0
B7621-2	89	108	4.5
B7621-5	148	156	4.5
B7629-1	137	154	2.5
B7631-5	64	84	4.5
B7632-3	122	157	4.0
B7633-2	97	118	4.5
B7635-4	56	82	5.0
B7636-4	86	114	4.0
B7649-5	51	67	5.0
B7654-1	54	80	4.5
B7654-12	80	95	5.0
B7694-1	78	104	5.0
B7707-1	80	95	5.0
B7743-4	49	71	5.0
B7744-4	116	124	3.0
B7755-1	57	67	4.0
B7763-3	83	107	4.0
B7786-3	104	127	5.0
B7802-2	105	116	3.5
B7805-1	90	103	5.0
B7805-6	58	76	5.0
Pa. 8L8	118	133	3.5
Pa. 70-A-12	122	161	2.0
F931	48	74	4.5
Sebago $\bar{x} \pm s\bar{x}$ (mean of 18 plots)	103 \pm 7	134 \pm 7	4.4 \pm 0.1
Pungo $\bar{x} \pm s\bar{x}$ (mean of 17 plots)	174 \pm 8	189 \pm 9	2.1 \pm 0.1

Russet Clones

B7147-8	78	99	4.0
B7147-81	76	113	5.0
B7147-90	76	102	5.0
B7147-94	84	102	4.0
B7587-5	22	28	5.0
B7608-2	50	71	4.5
B7608-4	61	82	4.5
B7637-9	16	33	4.0
B7655-2	128	159	4.5
B7676-2	86	110	4.5
B7678-2	69	90	4.0
B7678-6	35	48	4.5
B7680-6	79	105	5.0
B7680-10	62	108	5.0
B7683-6	60	77	5.0

Florida Table 2. (continued)

Stock	Yield		External ^{3/} tuber quality
	US"A"	Total ^{2/}	
	Cwt/A		
B7684-1	22	37	4.5
B7684-4	24	33	5.0
B7684-7	40	57	5.0
B7711-11	88	121	4.0
B7715-11	86	100	4.5
B7768-4	105	123	5.0
B7807-2	79	97	4.0
Norgold Russet $\bar{x} \pm s_{\bar{x}}$ (mean of 11 plots)	74 \pm 10	95 \pm 12	3.8 \pm 0.3

Golden Nematode Resistant Clones

B6887-22	157	173	4.8
B6987-1	278	295	2.2
B6987-29	247	267	2.5
B6987-43	206	220	3.3
B6987-54	204	214	1.5
B6987-56	274	291	2.5
B6987-57	186	204	2.5
B7151-4	310	325	1.8
B7152-3	164	187	3.3
B7152-12	214	232	2.0
B7152-14	197	217	2.5
B7153-29	211	227	0.5
B7153-30	146	176	2.8
B7154-6	242	274	2.0
B7154-10	215	236	3.0
B7155-51	234	258	3.0
B7155-56	147	181	3.0
B7589-5	182	193	2.0
B7589-9	143	167	3.8
B7590-1	171	184	1.3
B7592-1	207	219	1.5
B7608-2	193	224	1.5
B7608-4	119	147	2.5
B7633-2	193	218	2.0
B7635-4	125	152	3.5
B7649-5	200	213	4.5
B7654-1	123	146	4.0
B7654-12	180	200	2.0
B7680-6	187	214	2.0
B7680-10	109	126	1.3
B7743-4	110	133	1.3
B7744-4	172	179	1.3
B7763-3	227	250	1.8
B7805-1	237	248	2.0
B7807-2	251	263	1.8
Sebago $\bar{x} \pm s_{\bar{x}}$ (mean of 16 plots)	194 \pm 8	213 \pm 8	3.7 \pm 0.3

Florida Table 2. (continued)

Stock	Yield		External ^{3/} tuber quality
	US"A"	Total ^{2/}	
	Cwt/A		
Wauseon $\bar{x} \pm s_{\bar{x}}$ (mean of 8 plots)	182±16	198±17	1.7±0.2
Peconic $\bar{x} \pm s_{\bar{x}}$ (mean of 8 plots)	193±10	205±10	1.9±0.5

^{1/} Mean of two replications

^{2/} Includes both marketable and culls, size A and B

^{3/} External tuber quality 1 = excellent, 5 = poor

Florida Table 3. Results of 1973 observational seedlings trials.

Stock	Yield		External ^{2/} tuber quality
	US"A"	Total ^{1/}	
	Cwt/A		
B7828-9	225	273	2
B7832-2	146	186	2
B7858-2	159	208	4
B7863-1	131	154	3
B7866-3	76	87	5
B7871-3	182	189	3
B7872-7	113	131	5
B7888-9	182	215	3
B7910A-10	225	246	4
B7930-2	148	190	4
B8004-1	124	143	5
B7938-2	231	265	3
B7990-1	237	250	3
B8004-8	230	254	4
B8017-6	76	101	5
B8018-3	245	291	5
B8019-7	212	220	3
B8087-6	122	165	4
Sebago $\bar{x} \pm s_{\bar{x}}$ (mean of 6 plots)	166±14	201±14	3.8±0.2
Pungo $\bar{x} \pm s_{\bar{x}}$ (mean of 6 plots)	259±11	272±12	2.0±0.0

^{1/} Includes both marketable and culls, size A and B

^{2/} External tuber quality 1 = excellent, 5 = poor

FLORIDA

D. P. Weingartner, J. R. Shumaker and Raymon Webb

Corky Ringspot Resistance

Planting Methods. Seven cultivars and eight selections were evaluated for resistance to tuber symptoms of corky ringspot (CRS). Seed was cut by hand into seedpieces weighing approximately 2.0 oz and was planted February 8, 1973 in a randomized block design with four replications, each containing 15 seedpieces on a 12-inch spacing. Sebago and Pungo were included as, respectively, susceptible and resistant standards. Growing practices recommended for the Hastings, Florida area were followed throughout the season. Potatoes were harvested May 16, 1973.

Disease Ratings. Severe tuber quality defects characterized by russetting, growth cracks, and tuber malformation were observed on tubers harvested from the test area. Because such symptoms can be caused by factors other than infection by tobacco rattle virus, external tuber quality was rated. Ratings were made on tubers as they passed across a grading table. A scale of 1-5 was used, with 1 = no surface defects and 5 = 100% of the surface of all tubers affected. Typical surface symptoms of CRS were masked by other defects. Therefore, CRS severity was based on internal tuber symptoms of the disease. Ten randomly selected A-size tubers from each plot were cut with a commercial french fry cutter. Incidence of CRS was scored on a presence-absence basis. Severity of internal CRS was rated on a 1-10 scale with 1 = no internal necrosis and 10 = all tubers with at least 15-25% of the interior affected.

Results. Pungo, Plymouth, Green Mountain, B6951-1, and B7152-1 had no internal CRS symptoms. Merrimack was only slightly affected. Internal CRS was severe on all other cultivars and selections. Severity of internal CRS was closely correlated with external quality ratings. Those cultivars which were severely affected by CRS had the most severe external quality defects.

Florida Table 1. Yield, external tuber quality, percent tubers with internal CRS symptoms, and severity of internal CRS on cultivars and selections evaluated at Hastings, Florida during 1973.^{1/}

Cultivar or Selection	Yield (cwt/A)	External ^{2/} tuber quality	% Tubers ^{3/} with inter- nal necrosis	Severity ^{4/} internal necrosis
B6951-1	205.6	1.8	0	1.0
B6951-5	122.0	3.5	65	4.3
B7139-6	109.8	4.3	95	8.3
B7152-1	149.9	2.0	0	1.0
B7152-3	111.5	4.0	88	6.5
B7152-12	88.9	3.8	70	5.3
B7152-14	132.4	3.8	73	5.0
B7152-14	149.9	4.3	75	4.5
B7158-1	114.1	4.5	98	9.5
Green Mountain	213.5	2.3	0	1.0
Mohawk	110.7	5.0	70	5.3
Katahdin	137.7	4.3	65	4.8
Merrimack	194.3	2.3	3	1.3
Plymouth	187.3	2.8	0	1.0
Pungo	239.6	2.3	0	1.0
Sebago	172.5	3.8	88	6.3
LSD .01	58.6	1.5	20	2.0
LSD .05	44.0	1.1	27	1.5

^{1/} Data are mean values from four replications

^{2/} Rated on a scale of 1-5. 1 = no external quality defects; 5 = 100% of the surface of all tubers affected. All tubers from each plot were rated as they passed across a grading table.

^{3/} Ten randomly selected tubers from each plot were scored on a presence-absence basis.

^{4/} Rated on a scale of 1-10. 1 = no internal necrosis; 10 = all tubers with 15-25% interior affected.

PACIFIC NORTHWEST (IDAHO & OREGON)

J. J. Pavsek and D. R. Douglas

Greenhouse

Sixty-eight superior tetraploid (including nine andigena and seven phureja hybrids) and 20 diploid clones were crossed in 596 combinations. Most crosses were made to bring together superior processing quality, disease resistance, and yield in a long tuber. Two hundred sixty-seven families of seedlings were grown in 65,000 pots with 33,000 producing tubers. Seventy-nine latent-virus free lots of seed tubers were indexed for leafroll.

Field

Single hills (27,260) of 293 families were grown in scab and Verticillium infested fields at Aberdeen; 1050 were selected. From 1489 12-hill plots 503 were selected, specific gravities determined, and are yet to be french fried; these will be reduced to about 140 for planting in May 1974.

Eighty-nine selections of andigena, phureja, and stenotomum and 54 tuber families were screened for tuberization, specific gravity, and low sugars. The best will be used for greenhouse crossing in March-April 1974.

Yield Trials. Eight yield trials were conducted with 202 clones. These included preliminary, intermediate, and advanced clones, early and regular harvest. The Advanced Early Harvest Yield trial was also grown at the Malheur Experiment Station, Ontario, Oregon, by Niel Hoffman and Charles Stanger. They also grew an observational and a late harvest yield trial.

The trials were planted at Aberdeen during the first two weeks of May at a 10-inch spacing in 36-inch rows in a sandy silt loam soil. A RCB design was used. Two hundred pounds of nitrogen, 140 pounds of phosphate, and three pounds of Temik were applied per acre in bands at planting. Eptam was applied for weed control, methoxychlor was applied as a spray for beetle control, and Thiodan and Metasystox-R were applied August 2 and August 22 for aphid control. Dinitro was used to kill vines prior to harvest. Irrigation water was applied nine times between June 18 and September 1.

The temperatures during June, July, and August averaged 2.0 degrees below normal, but during the first half of June they were above normal. These early high temperatures along with a delayed first irrigation resulted in many jelly-end tubers.

The Advanced Yield Trial results are presented in P.N.W. Table 1. The three named check varieties yielded well below normal for this location and all of the test clones yielded more than these checks. The percent U.S. No. 1's and U.S. No. 1's over 10 ounce were high, and the specific gravities were also quite high with a mean of 1.092. Several of these clones show considerable promise as potential new varieties.

Fourteen selections and six named varieties were grown in the Advanced Early Harvest Yield Trial (P.N.W. Table 2). The performance of these 20 entries was very good at the Malheur Station but poor at Aberdeen. Unfavorable temperatures and delayed first irrigation probably were the cause of these poor yields at Aberdeen. NDA7697-2 and A6680-5, overall, are the best selections in this trial. Most of these entries produced french fries with dark ends at Aberdeen, but Nampa and Russet Burbank were the worst. Twelve of the entries had significantly less dark ends than Russet Burbank.

Eighteen selections with high specific gravities in 1972 were grown in a separate yield trial (P.N.W. Table 3). Only three of these clones yielded less dry matter per acre than Russet Burbank. Most of these selections possess good tuber type.

Disease Trials. Verticillium wilt data were obtained from the yield trials, but separate trials were planted for each of the following: early blight, scab, corky ringspot, and net necrosis. The data for all but the last of these are presented in P.N.W. Table 4. For each disease a number of the listed selections are more resistant than the Russet Burbank check. Some, e.g., A6823-7 and A68247-9, possess multiple resistance. The net necrosis trial has yet to be scored.

Distribution

A summary of the distribution of selections, varieties, seedling tubers, and true seeds is presented in P.N.W. Table 5.

P.N.W. Table 1. Advanced Yield Trial, Aberdeen, Idaho (Four replications of 20 hills)^{1/}

Clones	Total Tuber Yield cwt/A	Percent of Total Yield			Specific ^{2/} Gravity	French ^{3/} Fry Color	Tuber ^{4/}	
		US No. 1					Shape	Russetting
		Total	Over 10 oz	Under 4 oz				
A66102-13	397	84	27	10	102	1.8	0-L	M
A67490-2	337	91	50	7	89	3.5	L-0	M.fl.
A66107-44	325	91	40	7	90	2.5	0-L	M-
A66107-207	317	92	25	8	96	1.8	0	M
A66103-16	309	92	39	7	99	2.0	0-L	Lt
A66107-51	305	91	61	3	85	2.5	L-0	M
A66122-3	298	83	55	2	89	1.0	L-0	M
A67490-3	295	83	25	14	97	2.5	L-0	M+
A66107-107	291	91	38	7	102	1.8	0-L	Lt
A68678-1	285	88	31	9	94	1.0	L-0	M
A68294-3	263	87	21	11	84	3.0	L-0	M.Hv
A5400-15	242	79	17	17	90	1.5	0-L	Lt
A6698-4	241	84	22	12	92	2.0	0-L	M+
A66122-4	230	81	25	15	86	2.0	0-L	M
A67315-6	220	95	35	6	105	2.5	0	M+fl.
A63197-1	217	68	20	17	84	1.5	L	M
A67315-7	213	85	33	13	96	2.0	0	M
Russet Burbank	203	71	16	13	85	1.5	L	M
Nampa	198	86	21	14	89	1.8	L	M
Targhee	197	84	22	15	89	-	0-L	M.Hv
Mean	269	86	32	8	92	2.0		
LSD ₀₅	43				.004	0.4		

^{1/} Planted May 14, harvested October 8, 1973.^{2/} 1.0 omitted.^{3/} 1.0 (lightest) to 5.0 (darkest); in storage two months at 45°F; mean of two reps of three tubers.^{4/} 0 = oblong, L = long, 0-L = oblong-long, etc., M = medium, Lt = light, Hv = heavy, fl = flakey.

P.N.W. Table 2. Advanced Early Harvest Yield Trial (Four replications of 20 hills at each location).

	Malheur Experiment Station (Oregon) ^{1/}						Aberdeen Experiment Station (Idaho) ^{2/}					
	US No. 1			Fr. 4/			US No. 1			Fr. 5/		
	Total Tuber Yield cwt/A	All %	Over 10 oz %	Spec 3/ Grav.	Fry Color		Total Tuber Yield cwt/A	All %	Over 10 oz %	Spec 3/ Grav.	Fry Color	
Hi-Plains	528	89	25	78	0.5		188	69	11	84	1.1	0
NDA8451-3	526	88	28	83	0.5		151	82	12	71	0.9	L-0
NDA7697-2	518	93	34	79	0.5		220	77	20	75	0.9	O-R
A66107-169	469	82	50	75	1.0		193	88	46	68	1.8	O-L
A66110-7	468	92	25	85	1.0		168	70	4	82	1.7	O-R
A6680-5	466	90	16	89	0.5		165	68	1	82	1.0	L-0
A68730-7	460	85	13	84	0.8		197	63	4	90	1.2	0
A66107-12	452	90	25	82	0.5		167	65	10	84	1.4	0
Pioneer	441	88	29	80	1.0		205	78	16	83	1.4	O-L
Norgold Russet	427	88	12	84	1.0		149	64	3	77	2.7	0
NDA7698-1	424	85	34	82	1.0		212	81	11	73	1.4	L-0
A67284-5	408	88	30	90	0.5		178	73	10	77	1.4	L-0
A6334-17	407	84	11	85	0.5		117	55	1	85	1.6	M+
A66107-197	404	93	23	84	1.0		166	73	8	81	1.4	0
Nampa	384	83	15	85	0.5		128	74	11	83	1.9	O-R
NDA8505-2	378	80	21	86	0.5		170	72	15	82	1.3	L
Targhee	363	87	15	79	0.5		92	42	0	79	1.4	O-L
NDA7746-1	360	84	11	91	0.5		178	79	22	79	1.4	O-L
Russet Burbank	345	68	8	86	0.5		134	57	0	75	1.4	O-R
NDA8637-3	327	68	2	87	0.5		145	69	6	85	1.4	L
												O-L
Mean	428	86	22	84	0.7		166	71	12	80	1.4	
LSD ₀₅	49				0.2		40			.004	0.6	

^{1/} Planted April 18-19, harvested August 7; yield data supplied by Charles Stanger, Malheur Expt. Sta., Ontario, Oregon.
^{2/} Planted May 8, vines killed August 10, harvested Aug. 28.

^{3/} See appropriate P.N.W. Table 1 footnotes

^{4/} Two reps of 3 tubers

^{5/} Four reps of 3 tubers-both locations fried within two days of harvest.

P.N.W. Table 3. Yield Trial of High Specific Gravity Clones, Aberdeen, Idaho (Four replications of 20 hills) ^{1/}

Clones	Tuber Yield			Specific Gravity	Dry Matter %	French Fry Color	Tuber	
	Total cwt/A	US					Shape	Russetting
		No. 1 %	Under 4 oz %					
A66102-13	404	73	8	97	23.8	2.0	L-0	M
A63126-9	340	84	6	97	23.8	1.5	L-0	M
A6830-3	325	88	9	98	24.0	1.0	L-0	Lt.fl
A66107-107	307	92	7	100	24.4	1.5	L-0	Lt
A68241-6	299	96	3	91	22.5	1.0	0-R	Lt
A68254-4	272	82	11	97	23.8	1.0	0-L	V.Lt
A68674-1	268	84	14	99	24.2	1.8	0-L	V.Lt
Russet Burbank	263	76	14	84	21.1	1.5	L	M
A67315-6	261	91	6	103	25.1	2.0	0-L	M
A6595-3	260	90	8	111	26.8	1.0	0	Lt
A6353-6	256	68	26	104	25.3	2.0	0	M
Nampa	255	79	15	91	22.5	2.0	L	M
A6633-1	253	87	13	104	25.3	1.0	0	Lt.fl.
A68247-9	244	77	18	97	23.8	2.5	0-L	M+
A68247-2	231	89	10	103	25.1	1.8	0	M-
A62155-4	231	70	26	106	25.7	1.0	0-R	Lt
A68588-18	226	84	8	102	24.9	1.0	L-0	M-
A68648-1	225	77	17	97	23.8	1.5	0	V.Lt
A68254-11	219	77	21	109	26.3	1.0	0	M-fl.
A66133-8	181	76	16	97	23.8	2.3	0-R	Hv
Mean	266	82	12	99	24.2	1.6		
LSD ₀₅	51			.004	0.8	0.4		

^{1/} See P.N.W. Table 1 footnotes.

P.N.W. Table 4. Disease Evaluations, Mean Scores.

Clone	Maturity ^{1/}	Early ^{2/} Blight	Scab ^{3/}	Corky ^{4/} Ringspot	Verticillium ^{5/} Wilt
A5400-15	3.2	2.8			3.8
A5949-12	2.7	4.2	2.0	2.5	
A60220-1				1.3	
A62155-4	3.5	0.6	1.3	1.2	
A6334-17	2.5	4.7	1.5	2.2	
A6353-6	3.7	0.5	1.4	1.6	
A6371-2	3.1	3.2		2.3	
A6382-4				1.4	
A6382-10				1.4	
A63126-9	3.1	3.7	1.2	2.4	
A63197-1	3.0	2.8			3.7
A64140-3				1.1	
A64206-4	3.5	1.2		2.9	
A6595-3	3.3	1.7	2.2	1.4	
A6633-1	3.2	1.9	2.1	1.8	
A6673-1	2.6	4.6	1.4	2.3	
A6673-4	3.1	3.5		2.1	
A6680-5	2.9	4.3	1.2	2.3	
A6698-4	3.1	3.0			3.1
A66102-13	3.2	2.6			1.4
A66102-16	3.1	2.2	1.6	2.3	1.8
A66107-12	3.0	4.4	1.6	1.8	
A66107-44	3.1	2.4			2.4
A66107-51	3.4	1.9			0.6
A66107-107	3.5	3.4			1.0
A66107-169	3.0	3.1	1.4	1.4	
A66107-197	2.8	4.0	1.7	1.0	
A66107-207					2.2
A66110-7	2.9	3.7	1.2	1.3	
A66119-7	3.1	2.6		2.6	
A66122-3	3.1	3.3		2.4	0.9
A66122-4	3.0	3.0			2.0
A66133-8	3.1	2.0			
A6715-8	3.1	3.4			
A6721-16	3.4	2.8	1.1	1.5	
A6789-7	2.8	4.6			4.7
A67284-5	3.2	2.8	2.8	1.3	
A67315-6	3.4	2.2			0.6
A67315-7	3.4	1.3			0.6
A67341-4	3.1	3.5		1.9	
A67341-9A	3.3	2.0	1.8	1.5	
A67373-13				1.4	
A67490-2	3.2	2.4			1.1
A67490-3	3.0	2.6	1.5	1.5	2.4
A67524-1	3.2	2.2	1.2	1.1	
A67528-9	3.1	2.2	1.1	1.3	
A6802-3	2.5	4.2		2.9	
A6802-9	3.0	3.7	1.3	2.8	

P.N.W. Table 4. Continued

Clone	Maturity ^{1/}	Early ^{2/} Blight	Scab ^{3/}	Corky ^{4/} Ringspot	Verticillium ^{5/} Wilt
A6823-7	3.1	2.1	1.0	1.3	
A6827-4	3.0	2.9	1.3	2.1	
A6830-3	3.0	2.1	1.6	1.6	
A6833-2	3.1	2.6	1.6	1.6	
A6839-1	3.2	2.3	2.1	1.8	
A6883-28				1.9	
A68113-4	3.2	2.7	3.1	1.7	
A68233-6	3.1	3.3	1.4	1.8	
A68241-6	3.0	2.1	2.7	1.5	
A68247-2	3.2	1.8	1.7	1.6	
A68247-9	3.3	1.5	1.1	1.4	
A68254-4	3.0	2.3	2.4	1.6	
A68254-11	3.0	3.1	2.0	1.5	
A68287-4	3.0	3.0	1.2	1.4	
A68387-5	3.1	2.4	2.1	1.8	
A68294-2	3.1	2.7	1.1	1.9	2.4
A68318-8	3.1	2.9	1.3	1.6	
A68318-19	3.2	2.6	1.2	1.7	
A68320-11	2.9	3.1	1.5	2.4	
A68586-2	3.1	2.7	2.3	1.9	
A68587-3	3.0	2.9	1.9	2.2	
A68588-16	3.1	2.7	2.2	1.5	
A68588-18	3.2	2.5	1.8	1.4	
A68599-1	3.0	3.5	2.2	2.0	
A68648-1	3.0	3.0	2.3	1.6	
A68660-3	3.1	3.1	1.5	2.2	
A68660-10	2.9	2.9	1.1	2.6	
A68672-2	3.2	2.3	1.3	1.6	
A68674-1	3.0	2.9	1.8	1.6	
A68678-1	3.1	2.9	1.2	1.6	2.6
A68681-1	3.0	3.3	1.1	1.7	
A68683-2	2.9	4.1	1.1	2.2	
A68683-4	3.0	3.1	1.2	1.4	
A68683-7	3.1	2.7	1.4	1.9	
A68683-13	3.0	3.9	1.2	1.7	
A68683-14	3.1	3.9	1.5	1.8	
A68684-5	2.6	4.6	1.1	1.7	
A68686-17	2.7	4.0	1.4	1.6	
A68686-22	3.3	2.8	1.3	1.3	
A68689-1	2.8	3.8	1.2	2.1	
A68704-4	2.9	2.8	1.5	2.2	
A68709-2	2.9	3.7	1.3	1.2	
A68710-5	3.1	3.0	1.4	1.4	
A68710-7	2.8	4.2	1.5	1.7	
A68710-8	3.1	3.0	1.7	1.2	
A68710-13	3.0	3.3	1.9	2.2	
A68721-1				1.2	

P.N.W. Table 4. Continued

Clone	Maturity ^{1/}	Early ^{2/} Blight	Scab ^{3/}	Corky ^{4/} Ringspot	Verticillium ^{5/} Wilt
A68721-2				1.2	
A68730-2				1.1	
A68730-4				1.1	
A68730-7	3.0	3.6	2.3	1.1	
A69657-4	2.9	3.9	2.1	1.6	
NDA7697-2	3.0	4.6	1.7	1.8	
NDA7698-1	2.7	4.8	1.1	2.0	
NDA7746-1	2.4	4.6	1.1	2.2	
NDA8451-3	2.0	5.0	1.5	2.0	
NDA8505-2	2.5	5.0	1.4	2.1	
NDA8637-3	3.0	3.8	1.3	1.7	
NDA8694-3	2.9	4.6	1.3	2.9	
NDA8856-11	2.8	4.7	2.5	1.2	
Hi-Plains	3.1	4.0	2.1	2.4	
Nampa	3.1	2.3	1.0	2.2	3.7
Norgold Russet	2.8	3.7	1.2	1.9	
Nooksack	3.1	2.6			
Pioneer	3.0	4.0	2.4	1.7	
Russet Burbank	3.1	2.4	1.2	2.4	2.8
R. B. PVX free	3.0	2.4		2.4	
Targhee	3.2	2.5	1.1	2.4	2.4

1/ 1.0 (very early) to 5.0 (very late).

2/ 1.0 (least) to 5.0 (severe).

3/ Index: 1.0 (none to trace) to 6.0 (100% covered).

4/ 1.0 (none) to 4.0 (severe).

5/ 1.0 (least) to 4.0 (severe).

P.N.W. Table 5. Distribution of Selections, Varieties, Seedlings, or Seeds, 1973.

Location	Cooperator	Number
Arizona	P. Bessey	196
Australia	D. Wishart	7
Brazil	E. Germeck	5
California	N. Delis	2
	R. Voss	18
Colorado	K. Knutson	3
Idaho	E. Anderson	2
	D. Corsini	2
	M. Groskopp	1
	W. Henninger & D. Robertson	18
	H. McKay	2
	R. Ohms	5
	R. Romanko	4
Kansas	T. Wagner	8
Maryland	R. Webb	5
Oregon	N. Hoffman	36
	W. Thiessen	9
Wisconsin	M. Cipar	1
<u>Seedlings</u>		(Families)
Alberta	S. Molnar	181
Maine	R. Akeley	150
North Dakota	R. Johansen	119
<u>Seeds</u>		(Crosses)
Alberta	S. Molnar	39
Colorado	D. Denna	60

KANSAS

J. K. Greig

Evaluation of Potato Selections, 1973 Manhattan, Kansas

Pedigree	Yield cwt/A		Specific gravity	Wt. 25 tubers lbs.	Vine maturity
	US#1	Total			
B6599-1	312	395	1.054	12.0	4
B6534-2	287	338	1.066	10.9	5
B6376-6	68	85	1.057	too few	2
B6516-15	228	263	1.073	12.4	5
Norchip	270	326	1.068	13.1	5
Kennebec	223	300	1.055	12.7	5
Superior	181	207	1.062	12.0	2

Planted: April 2

Harvested: July 27

Fertilizer: 50 + 30 + 0 lb/A at planting

50 + 0 + 0 May 15

50 + 0 + 0 May 22

Irrigated May 24, June 19, July 2 and 9.

Climatic Conditions:

<u>Month</u>	<u>Ave. Temp. ° F.</u>	<u>Rainfall (inches)</u>
April	53	2.07
May	63	6.23
June	76	2.89
July	79	5.89

LOUISIANA

James F. Fontenot, Donald W. Newsom
Royzell J. Constantin, and Wayne J. Bourgeois

Potato Breeding and Development

The principal objectives of the Louisiana potato breeding project are wide adaptability, high yield, frost, heat and drought resistance, insect and disease resistance (particularly late blight and scab), improved culinary quality (including chipping quality, french frying quality, and baking quality), resistance to after-cooking darkening, improved storage ability, better shape and skin color and resistance to tuber greening. Development of an oblong russet type adapted to Louisiana conditions is highly desirable.

Other objectives are to gain a further insight into the physiological changes during rest and to ascertain the effect of growth regulators, applied as pre-plant, preharvest and postharvest treatments on the production, storage ability and quality of potatoes.

With these objectives in mind, approximately 10,000 seedlings were selected in the Louisiana greenhouses. These lines were planted in late May at Rhinelander, Wisconsin, and were harvested in late September. Only 217 clones were considered worthy of further testing; Louisiana Table 1.

In the fall of 1972 a total of 146 individual lines were selected in Wisconsin. At this stage 26 clones seem to fit in our program. Some notes on these 1972 clones are found in Louisiana Table 2.

Fifty-eight 1971 clones were grown in the spring of 1973 at Baton Rouge, Louisiana. The 29 considered worthy of further study were: (1) 11-1; (2) 11-6; (3) 11-19; (4) 11-21; (5) 12-24; (6) 12-29; (7) 12-34; (8) 12-36; (9) 11-59; (10) 11-68; (11) 11-74; (12) 11-89; (13) 11-94; (14) 12-101; (15) 11-103; (16) 11-104; (17) 11-105; (18) 11-107; (19) 11-118; (20) 11-127; (21) 11-150; (22) 12-161; (23) 11-168; (24) 11-178; (25) 11-181; (26) 11-187; (27) 12-196; (28) 12-206; (29) 11-208.

In the fall of 1973 at Rhinelander, Wisconsin, 18 passed the hurdles for further testing and these were: (1) 11-1; (2) 12-24; (3) 12-34; (4) 12-36; (5) 11-68; (6) 11-74; (7) 11-89; (8) 11-94; (9) 11-103; (10) 11-104; (11) 11-105; (12) 11-118; (13) 11-127; (14) 11-150; (15) 11-187; (16) 12-196; (17) 12-206; (18) 11-208. The performance summary of 1971 clones is found in Louisiana Table 3.

Yield and quality comparisons of varieties and clones grown at Baton Rouge in 1973 are presented in Table 4. This test was conducted at Burden Plantation, which has a much lighter soil type than Mississippi River Bottom soils. Clone 71-110 was in a class by itself in tuber type and general appearance. Wisconsin 717 produced a high yield and gravity and along with its chipping ability is certainly worthy of further testing. Minnesota 4536 produced and chipped well and may have some promise in the south. Norchip performed well, but certainly is no better than LaChipper. The deep eyes of LaChipper and

pear shape of Norchip are definitely poor tuber characteristics. Norland did the best it has ever done and though its general appearance and yield is not in the class of Red LaSoda and LaRouge, the earliness it possesses might warrant trial on lighter soils.

Data on other advanced clones are presented in Table 5. The prominent points of this test are the high yield of 01-80; the high gravity of 01-70; the good chip color of LaChipper, 71-82, 91-157, and 01-70; and the low blackening after-cooking scores of 01-70, 01-80, 01-112, and 02-201.

Other important results recorded in 1973 are that clones differ in their greening tendencies when exposed to light and 71-110 shows the least greening of any line we have in our program.

Also, in an adaptability trial conducted at Port Sulphur the outstanding yield produced by LaRouge and Red LaSoda was gratifying.

Vine killing has become a common practice throughout the potato producing area of the United States. A study was conducted to determine the effects of vine killing on tubers of Red LaSoda potatoes during and after harvest. The study included observations on percent vine kill, yield, specific gravity, chip color, internal and vascular discoloration, after-cooking darkening, feathering and weight loss. The vine killing techniques employed involve the use of chemical and mechanical methods.

The data collected for 1971 and 1972 showed that all treatments gave satisfactory vine kill, with the mechanical methods having the most rapid rate of vine kill.

Yield, specific gravity, feathering, after-cooking darkening, internal and vascular discoloration, chip color and weight loss were not affected by vine kill in either the 1971 or 1972 studies.

Dinoseb at 1 and 2 pounds gave quicker vine kill than any other chemical in 1971. Ametryne at 1/2 and 1 pound gave the slowest vine kill of any of the treatments. Paraquat at 1-1/4 and 1-1/2 pounds gave quicker vine kill than any other chemical in 1972. The flame and hoe gave the quickest vine kill for both 1971 and 1972.

The use of chemical or mechanical methods of vine removal had no harmful effects on tuber quality.

Louisiana Table 1. Clones and their parentage selected in 1973 at Rhinelander, Wisconsin

<u>Clones</u>	<u>Parentage</u>	<u>Clones</u>	<u>Parentage</u>	<u>Clones</u>	<u>Parentage</u>
31-1	12-142 x 1859	31-51	61-29 x 71-110	31-101	61-71 x 71-110
32-2	" "	31-52	" "	31-102	" "
32-3	" "	31-53	71-177 x 71-110	31-103	" "
31-4	" "	31-54	" "	31-104	" "
31-5	" "	31-55	" "	31-105	" "
31-6	" "	31-56	" "	31-106	" "
31-7	" "	31-57	" "	31-107	" "
31-8	" "	31-58	" "	31-108	" "
32-9	" "	31-59	" "	31-109	" "
32-10	" "	31-60	" "	31-110	" "
31-11	" "	31-61	" "	31-111	" "
31-12	61-29 x 71-110	31-62	" "	31-112	" "
31-13	" "	31-63	" "	31-113	61-80 x 71-110
31-14	" "	31-64	" "	31-114	" "
31-15	" "	31-65	" "	31-115	" "
31-16	" "	31-66	" "	31-116	" "
31-17	" "	31-67	" "	31-117	" "
31-18	" "	31-68	61-29 x 71-110	31-118	Minn. 1317 x 71-110
31-19	" "	31-69	61-71 x 71-110	31-119	" "
31-20	" "	31-70	" "	31-120	" "
31-21	" "	31-71	" "	31-121	" "
31-22	" "	31-72	" "	31-122	" "
31-23	" "	31-73	" "	31-123	" "
31-24	" "	31-74	" "	31-124	" "
31-25	" "	31-75	" "	31-125	" "
31-26	" "	31-76	" "	31-126	" "
31-27	" "	31-77	" "	31-127	" "
31-28	" "	31-78	" "	31-128	" "
31-29	" "	31-79	" "	31-129	" "
31-30	" "	31-80	" "	31-130	N.D. 6937-13 x 71-110
31-31	" "	31-81	" "	31-131	" "
31-32	" "	31-82	" "	31-132	" "
31-33	" "	31-83	" "	31-133	N.D. 5922-12 x 71-110
31-34	" "	31-84	" "	31-134	" "
31-35	" "	31-85	" "	31-135	" "
31-36	" "	31-86	" "	31-136	" "
31-37	" "	31-87	" "	31-137	" "
31-38	" "	31-88	" "	31-138	B5141-6 x 22-111
31-39	" "	31-89	" "	31-139	" "
31-40	" "	31-90	" "	31-140	" "
31-41	" "	31-91	" "	31-141	" "
31-42	" "	31-92	" "	31-142	71-80 x 71-110
31-43	" "	31-93	" "	31-143	" "
31-44	" "	31-94	" "	31-144	" "
31-45	" "	31-95	" "	31-145	" "
31-46	" "	31-96	" "	31-146	" "
31-47	" "	31-97	" "	31-147	" "
31-48	" "	31-98	" "	31-148	" "
31-49	" "	31-99	" "	31-149	" "
31-50	" "	31-100	" "	31-150	" "

Louisiana Table 1. Clones and their parentage selected in 1973 at Rhinelander, Wisconsin (Continued)

<u>Clones</u>	<u>Parentage</u>	<u>Clones</u>	<u>Parentage</u>
31-151	71-80 x 71-110	31-185	51-176 x 1859
31-152	8331 x 71-110	31-186	" "
31-153	N.D. 5922-12 x 61-80	31-187	" "
31-154	8117 x 1859	31-188	" "
31-155	" "	31-189	" "
31-156	" "	31-190	" "
31-157	" "	31-191	" "
31-158	" "	31-192	" "
31-159	" "	31-193	" "
31-160	" "	31-194	" "
31-161	" "	31-195	" "
31-162	" "	31-196	" "
31-163	61-48 x 11-150	31-197	51-172 x 1859
31-164	" "	31-198	" "
31-165	" "	31-199	" "
31-166	" "	31-200	" "
31-167	" "	31-201	" "
31-168	" "	31-202	" "
31-169	" "	31-203	" "
31-170	" "	31-204	" "
31-171	" "	31-205	4465 (x)
31-172	" "	31-206	" "
31-173	" "	31-207	" "
31-174	" "	31-208	LaChipper (x) (Dr. Miller)
31-175	" "	31-209	" " "
31-176	" "	31-210	" " "
31-177	" "	31-211	Cobbler x 11-170
31-178	" "	31-212	" "
31-179	51-176 x 1859	31-213	" "
31-180	" "	31-214	" "
31-181	" "	31-215	" "
31-182	" "	31-216	" "
31-183	" "	31-217	" "
31-184	" "		

Louisiana Table 2. Notes on 1972 clones.

<u>Clones</u>	<u>Parentage</u>	<u>Vigor</u> ^{1/}	<u>Maturity</u> ^{2/}	<u>Chip</u> ^{3/} <u>Color</u>	<u>Specific</u> <u>Gravity</u>	<u>Remarks</u>
22-11	61-48 x 41-182	2.5	M	5.5		
21-14	51-80 x 41-182	3	M	7.0		
21-31	71-156 (x)	4	M	8.7		seed
21-44	" "	3	M	5.0		
22-51	21-26 x A-4-22-222	4	ML	9.0		nice type
21-59	61-71 (x)	4	M	8.0	1.079	nice type
21-61	" "	4	M	3.0		
21-66	" "	4	M	4.0		
21-71	" "	4	M	7.0	1.080	nice
21-75	" "	4	ME	7.0	1.077	nice
22-78	72-7 (x)	4	M	8.3	1.084	
22-83	" "	3.5	ME	8.0	1.080	
21-89	71-61 (x)	3	M	9.0	1.071	
21-93	" "	3.5	M	5.5	1.084	
21-97	71-61 x 8340	4	ME		1.078	
21-98	" "	4	M	8.0	1.083	very nice
21-99	" "	3	M	8.0	1.084	seed
21-103	72-190 x A-4-22-222	4	M	10.0	1.082	
22-117	A1-22-222 x 62-104	4	L	6.0	1.075	
22-122	12-166 x 62-104	3	M	8.0	1.070	
21-123	" "	4	M	4.0	1.083	
21-126	51-2 x 41-182	3	L	5.5		
21-128	61-112 (x)	3	ME	3.5	1.079	
22-133	62-104 (x)	3	ML	7.5	1.076	
22-137	12-166 x A4-22-222	4	M	7.0		
21-140	Superior x 1859	3	M	7.0	1.079	excellent

^{1/}Vigor; 1 = weak; 5 = very vigorous

^{2/}E = early; M = medium; L = late; VL = very late

^{3/}Rating 1-10 (1 = most desirable; 10 = least desirable)

Louisiana Table 3. Performance summary of 1971 clones.

Clones	Parentage	Vigor ^{1/}	Maturity ^{2/}	Yield		Specific Gravity	Chip Color ^{3/}	After Cooking Darkening ^{4/}
				# 1's/cwt/A	Total cwt/A			
11-1	71-61 x 41-182	4.0	ML	52	80	1.076	3.5	4.0
12-24	62-104 x A2-22-222	2.0	M	78	94	1.084	2.5	3.0
12-34	" "	3.5	M	68	109	1.079	6.0	4.0
12-36	" "	3.0	M	107	134	1.078	7.0	4.3
11-68	61-112 x 41-182	4.0	E	135	149	1.070	6.0	4.0
11-74	" "	3.0	ME	67	111	1.069	6.0	4.3
11-89	" "	4.0	L	116	148	1.074	6.0	3.3
11-94	" "	3.5	M	152	170	1.064	6.0	1.7
11-103	61-112 x 8340	4.0	L	120	143	1.070	6.1	3.0
11-104	" "	3.0	ML	89	108	1.073	7.0	3.0
11-105	" "	4.0	ML	149	182	1.072	7.0	3.0
11-118	61-84 x 41-182	3.0	ME	105	126	1.077	6.0	3.7
11-127	" "	2.0	ME	112	136	1.079	5.0	3.2
11-150	61-48 x 41-182	4.0	ML	128	154	1.086	4.7	3.8
11-187	12-142 x 1859	2.5	M	88	98	1.072	5.5	5.0
12-196	62-104 x A4-22-222	4.0	L	115	130	1.075	4.7	4.3
12-206	RLS x 62-104	4.0	M	142	180	1.069	8.0	4.0
11-208	61-80 (x)	3.5	M	119	135	1.070	6.7	2.0

^{1/}Vigor; 1 = weak; 5 = very vigorous

^{2/}E = early; M = medium; L = late; VL = very late

^{3/}Rating 1-10 (1 = most desirable; 10 = least desirable)

^{4/}Rating 1-10 (1 = most desirable; 10 = least desirable)

Louisiana Table 4. Yield and quality comparisons of varieties and clones grown at Baton Rouge in 1973

Variety	Average Maturity	Average Yield	Average Yield US #1	Average Total Solids	General Notes
	Vigor* Maturity**	cwt/A	cwt/A		Chip Color***
Early to medium early					
Minn. 4536	3.5 M	165	137	18.2	3.5
Minn. 4537	2.0 M	78	54	18.8	3.2
Norland	3.0 E	118	88	16.5	5.0
Cobbler	3.0 M	86	65	18.6	2.0
Norchip	3.0 M	105	93	18.6	3.0
Medium to late					
Neb. 93.55-16	2.0 ME	78	60	19.2	3.8
Neb. 47.62-1	3.5 ML	128	113	19.9	8.0
Neb. 52.57-1	3.0 L	112	94	20.3	3.0
La. 71-82	3.5 ML	124	127	18.6	2.5
La. 71-110	3.5 ML	103	91	19.2	3.0
La. 91-157	3.0 M	110	94	18.4	2.5
LaChipper	3.0 M	109	90	18.4	2.0
Wisc. 623	2.5 M	121	84	18.6	3.0
Wisc. 707	3.0 ML	94	84	18.8	2.5
Wisc. 717	3.5 M	154	121	20.3	1.6
Minn. 3935	3.0 M	109	97	17.7	4.3
ND 6634-2R	3.0 ME	116	95	16.7	3.0
Red Pontiac	3.0 ML	103	90	18.0	8.0
Red LaSoda	3.5 L	128	101	18.0	8.0
LaRouge	3.5 ML	144	127	17.7	6.0

*Vigor - 1 = weak; 5 = very vigorous

**Maturity - E = early; M = medium; L = late; ME = medium early; ML = medium late

***Rating according to color chart of Procter & Gamble scale of 1-10; the lower the rating, the lighter the chip color

Louisiana Table 5. Yield and quality comparisons of varieties and advanced clones grown at Baton Rouge in 1973

Clones	Parentage	<u>1/</u> Vigor	<u>2/</u> Maturity	Total cwt/A	Specific Gravity	Chip Color <u>3/</u>	After cooking <u>4/</u> Darkening
Red LaSoda	Triumph x Kat. (mutant)	3.5	L	128	1.072	10.0	3.5
LaChipper	Gr. Mt. x Cayuga	3.0	M	109	1.074	2.0	3.5
LaRouge	02-5 (x)	3.5	ML	144	1.071	8.5	3.5
71-82	11-150 x 11-40	3.5	ML	124	1.075	2.7	2.5
71-110	Chippewa x 11-150	3.0	ML	103	1.078	4.0	5.0
91-157	31-147 x 1859	3.0	M	88	1.074	2.0	2.5
91-237	42-225 x 22-234	3.0	M	111	1.072	7.0	2.8
02-59	LaRouge x 1859	3.0	M	131	1.068	8.0	2.0
01-70	LaChipper x 1859	2.0	M	105	1.084	3.7	1.1
01-80	LaChipper x 1859	3.0	M	131	1.076	6.7	1.5
01-112	11-150 x 1859	2.0	M	75	1.072	5.3	1.0
01-115	11-150 x 1859	3.0	M	94	1.078	5.0	2.5
02-201	72-4 x 22-222	2.5	E	83	1.074	4.5	1.5

1/ Vigor; 1 = weak; 5 = very vigorous

2/ E = early; M = medium; L = late; VL = very late

3/ Rating 1-10 (1 = most desirable; 10 = least desirable)

4/ Rating 1-10 (1 = most desirable; 10 = least desirable)

MAINE

Robert Akeley and Robert Long
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The objective of the Potato Breeding Program in Maine is essentially the same. Earlier maturing varieties with superior culinary qualities, especially for processed products, are needed to replace the Katahdin and Russet Burbank which mature too late for best results when grown in Maine.

Over 115 crosses and selfed lines were completed among 60 selected parents throughout March and April, 1973. Parents possessing yielding ability, earlier maturity, and processing qualities are emphasized in the breeding program. From 51 family lines 11,082 single-hill tubers were grown from true seed to maturity in 3" pots at Aroostook Farm.

Approximately 49,800 single-hill seedlings were grown at Masardis, Maine. To obtain this population for increase 39,000 were supplied from the potato breeding program in Idaho, New Jersey, North Dakota, and Washington. Twelve hundred and fifty-three seedlings were selected for increase and evaluation in 1974.

Nine hundred and twenty-three seedlings were increased in 12-hill rows and 169 were selected at harvest for re-evaluation in 1974. These selections have been or will be evaluated for maturity, tuber characteristics, yield, specific gravity, freedom from disease, resistance to some diseases, and processing qualities with further reduction in this number before replanting in 1974. These 923 seedlings plus 100 survivors from past years were also maintained in our isolated field index plot. The 1,023 maintained here in 1973 were screened for virus X and were found free from X.

Over 200 selections were tested for the amount of TGA present in their tubers. Most of the seedlings tested were in the acceptable range of tolerance. Of the 79 seedlings evaluated for resistance to tuber greening and verticillium wilt many were found with acceptable levels of resistance. Also 250 seedlings were screened for resistance to virus X, 28 for net necrosis and stem end browning, 95 for uncommon scab, and 26 for ring rot.

The data presented here are from replicated seedling yield tests grown at Perham and Presque Isle, Maine, 1973. The three tests grown at Perham were planted May 18, killed September 8, and harvested September 18. Those grown at Presque Isle were planted June 6, killed September 7 and harvested September 20. Yield, specific gravity, tuber description, maturity and processing quality of seedlings and checks are presented in tables 1 to 6.

Maine Table 1. Yield, specific gravity, tuber description, maturity, and chip and french fry quality for 10 selections grown in the early maturing yield test, Berham, Maine, 1973.

Selection	Yield over		Specific gravity	Tuber description			Maturity	Chip <u>5</u> Color	French fry <u>5</u>	
	Cwt/A	%		Rating	1/	2/			Color	Texture
CC 01 - 4a	244	72	1.083	3	White	L-R	M	7.1	1.5	1.0
CC 17 - 8a	194	76	85	4	light rus	L-R	Me	5.0	1.0	1.0
AF 24 - 6	218	67	83	3	White	ob-R	M	7.3	2.0	1.0
AF 76 - 7	316	87	79	3+	White	ob-R	M	9.4	4.0	1.1
AF 76 - 8	298	79	69	4+	White	ob-R	Me	9.1	3.3	1.4
B7132 - 1	353	94	85	3	w, net	R	M	6.0	1.4	1.0
B7196 - 17	219	83	83	3	light rus	ob-R	M	6.2	1.0	1.0
B7196 - 74	259	81	81	4	med rus	ob-L,R	M	7.0	1.4	1.5
B7200 - 1	358	96	74	4+	White	ob-R	ML	9.5	2.8	1.4
I Cobbler	314	84	83	3	White	ob-R	Me	7.1	1.8	1.0

LSD (05) 51 04

1/ 1 = poor to 5 = excellent

2/ W = white, B = buff, Rus = russet

3/ R = round, ob = oblong, O = oval, L = long

4/ e = early, M = medium, L = late

5/ Chip color, 1 = light to 10 = dark; French fry color, 1 = light to 5 dark; texture, 1 = mealy to 5 soggy.
All samples stored at 50° F. from harvest until fried December 14-17.

Maine Table 2. Yield, specific gravity, tuber description, maturity, and chip and french fry quality for 13 selections grown in the medium maturing yield test, Perham, Maine, 1973 1/

Selection	Yield over 2 inches		Specific gravity	Tuber description			Maturity	Chip		French fry	
	Cwt/A	%		Rating	Color	Shape		Color		Color	Texture
CC 06 - 12a	268	86	1.083	4+	w	ob-R	M	3.0		3.7	1.0
CC 14 - 3a	199	75	78	4	w	R	L	6.5		1.2	1.0
CC 21 - 5a	258	88	84	4	w	R	eM	7.7		2.2	1.0
CC 26 - 1a	318	90	90	3+	w	L-R	M	7.8		1.5	1.0
CC 28 - 2a	297	92	95	4	w	ob-R	M	5.0		1.0	1.0
CC 28 - 4a	246	93	91	3+	B	ob-R	ML	7.8		2.0	1.0
CC 32 - 3a	150	68	72	3+	w,net	ob-R	e	8.5		2.5	1.0
CC 42 - 6a	132	58	79	4+	w	L-R	M	6.5		1.5	1.0
CC 51 - 1a	268	86	87	4	w,net	ob-R	M	8.6		1.4	1.0
AF 41 - 2	361	91	85	4	w,net	ob-R	M	8.6		2.2	1.0
7168 - 10	321	92	71	4+	w,net	ob-R	eM	10.0		2.7	1.2
37196 - CC	257	83	80	3+	light rus	ob-R	M	7.0		1.7	1.0
Wauseon	320	89	79	3	w	R	eM	6.7		1.0	1.0
LSD (05)	45		06								

1/ See footnotes Table 1.

Maine Table 3. Yield, specific gravity, tuber description, maturity and chip and french fry quality for 19 selections grown in the late maturing yield test at Perham, Maine, 1973 1/

Selection	Yield over 2 inches Cwt/A	%	Specific gravity	Tuber description			Maturity	Held at 50° F.	
				Rating	Color	Shape		Chip Color	French Fry Color Texture
CC 01 - 5a	288	83	1.086	4	w,net	ob-R	ML	7.2	1.8 1.0
CC 12 - 7a	251	92	83	3	rus	ob-L,R	L	10.0	4.1 1.0
CC 42 - 4a	285	84	77	4+	w	L-R	ML	7.0	1.1 1.0
CC 53 - 8a	356	83	74	3+	w	ob-O	M	9.5	3.7 1.0
CC 54 - 3a	324	84	86	3+	w,net	R	L	6.7	1.0 1.0
CC 54 - 21a	227	73	87	4	w	ob-R	L	6.0	1.0 1.0
CC 65 - 3a	256	88	82	3+	w,net	R	L	7.3	1.4 1.0
CC 71 - 6a	286	88	86	4+	w,net	ob-L,R	L	7.8	1.9 1.2
CC 76 - 12a	293	90	77	4	w,net	L-R	L	8.1	2.3 1.0
AF 40 - 9	271	76	81	4	scaly net	R	ML	8.3	2.3 1.0
AF 32 - 8	382	88	72	3+	w	ob-R	ML	9.8	2.5 1.0
AF 41 - 17	396	93	81	4	w	ob-O	ML	8.1	2.0 1.5
AF 84 - 4	312	94	85	4+	w	ob-R	L	5.1	1.0 1.0
AF 85 - 4	366	91	84	3	w	ob-R	ML	8.6	2.7 1.1
AF 92 - 3	378	93	76	4-	w,net	ob-R	L	9.7	1.7 1.0
B7163 - 14	384	88	70	4	w	ob-R	L	7.5	1.3 1.1
B7191 - 7	392	93	79	3	w	ob-R	L	9.3	2.0 1.0
B7200 - 23	312	89	71	4	Red	R	LL	9.9	2.1 1.1
Kennebec	326	92	80	3	w	ob-R	L	8.3	2.0 1.0
LSD (05)	41		05						

1/ See footnotes Table 1.

Maine Table 4. Yield, specific gravity, tuber description, maturity, chip and french fry quality for 11 selections grown in the early maturing yield test, Presque Isle, Maine, 1973.

Selection	Yield over 2 inches		Specific gravity	Tuber description		Maturity 4/	Held at 50° F. 5/	
	Cwt/A	%		Rating 1/	Color 2/ Shape 3/		Chip Color	French Fry Color Texture
B 6987 - 16	266	96	1.065	3+	w ob-R	ML	9.3	2.1 1.7
B 6955 - 35	278	96	84	3	w ob-R	ML	9.0	1.0 1.3
B 6987 - 18	304	98	80	3	w ob-O	ML	9.0	2.1 2.1
B 6987 - 57	308	98	96	3	w,net R-O	L	8.8	1.0 1.0
B 7033 - 17	291	96	87	3	w,net ob-R	Me	9.2	1.3 1.0
BR7093 - 2	306	98	84	4	w,net ob-R	M	7.7	2.1 1.1
B 7147 - 19	209	92	81	3	light rus L-O	e	9.5	3.2 1.3
B 7147 - 37	237	91	79	3+	light rus L-R	e	5.5	1.5 1.0
B 7147 - 73	271	91	94	3	light rus L-O	Me	8.5	2.3 1.0
B 7196 - 4	267	92	69	4	med rus ob-L,R	e	7.3	1.6 1.7
Superior	315	97	80	3+	w ob-R	e	9.0	1.3 1.3
LSD (05)	54		05					

1/ 1 = poor to 5 = excellent

2/ w = white, B = buff, rus = russet

3/ R = round, ob = oblong, O = oval, L = long

4/ e = early, M = medium, L = late

5/ Chip color, 1 = light to 10 very dark; french fry, 1 = light to 5 dark; texture, 1 = mealy to 3 soggy, all samples stored at 50° F. from harvest until fried December 14-17. All trials grown at Presque Isle were planted June 6, killed September 7 and harvested September 20.

Maine Table 5. Yield, specific gravity, tuber description, maturity and chip and french fry quality for 12 selections grown in the medium maturing yield test, Presque Isle, 1973. 1/

Selection	Yield over 2 inches Cwt/A	%	Specific gravity	Tuber description			Held at 50° F.			
				Rating	Color	Shape	Maturity	Chip Color	French Fry Color	Texture
B6532 - 5	301	92	1.077	3	w	R	M	7.4	1.7	1.0
B6952 - 10	330	98	91	3+	w,net	R	M	5.5	1.0	1.0
B6955 - 5	281	98	74	3+	w	ob-R	ML	6.1	1.7	1.0
B6987 - 34	344	97	83	3	w	ob-O	ML	9.5	3.5	1.3
B7147 - 8	260	92	88	3+	med rus	ob-R	ML	8.3	2.5	1.3
B7147 - 22	307	87	81	3	med rus	ob-L,R	M	7.0	1.6	1.0
B7147 - 38	208	90	76	3	med rus	ob-R	M	8.4	1.8	1.0
B7196 - 7	285	95	76	3	med rus	L-O	M	10.0	3.2	1.2
B7196 - 23	357	96	77	3+	light rus	L-R	ML	10.0	3.3	1.4
B7196 - 36	277	94	69	3	heavy rus	ob-L,O	M	8.1	2.0	1.1
B7196 - 46	321	97	72	3	med rus	ob-R	ML	9.7	3.8	1.0
Wauseon	336	96	79	3+	w	ob-R	ML	8.0	1.6	1.2

LSD (05) 41

1/ See footnotes Table 4.

Maine Table 6. Yield, specific gravity, tuber description, maturity, and chip and french fry quality for 15 selections grown in the late maturity yield test, Presque Isle, 1973.1/

Selection	Yield over 2 inches Cwt/A	%	Specific gravity	Tuber description			Held at 50° F.			
				Rating	Color	Shape	Maturity	Chip Color	French Fry Color	Texture
B 6544 - 4	312	95	1.078	3	light rus	ob-R	L	8.5	2.1	1.0
B 6987 - 43	305	98	86	3	w	R	L	6.5	1.0	1.0
BR7051 - 3	287	96	94	4	w,net	ob-R	ML	7.2	1.5	1.0
BR7068 - 3	244	96	79	4	w	R	ML	7.0	1.6	1.3
BR7089 - 1	295	99	79	3+	w	L-R	ML	7.5	1.0	1.2
B 7147 - 26	278	96	85	3	light rus	L-R	L	9.5	3.3	1.4
B 7147 - 64	252	96	80	3	med rus	L-R	ML	7.5	1.5	1.0
B 7147 - 75	275	92	84	3+	med rus	ob-L,R	L	9.0	1.5	1.0
B 7147 - 76	285	97	90	4	med rus	ob-L,R	ML	9.7	2.4	1.0
B 7147 - 80	266	92	82	3-	med rus	ob-O	ML	7.1	2.1	1.0
B 7196 - 27	281	94	75	4	med rus	L-R	L	7.1	3.0	1.2
B 7196 - 82	315	98	78	4	med rus	ob-L,R	L	8.1	3.3	1.0
B 7196 - 90	342	97	82	3	med rus	ob-L,R	ML	8.4	3.7	1.2
B 7196 - 101	281	91	73	3	med rus	L-R	L	8.2	1.1	1.0
Kennebec	374	98	79	3	w	ob-R	ML	9.8	2.8	1.1
LSD (05)	35		03							

1/ See footnotes Table 4.

MAINE

F. R. Holbrook, USDA and Carleton Brown, U. of Maine

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Insect Resistance in Potatoes

Electronic devices have been used to evaluate the feeding of insects on their hosts. We have developed a small machine which, when wired to an aphid or other sucking insect, gives a record of feeding activity. This is then translated into a relative acceptability of the plant as a source of food. Now that the prototype has been built, a working model will be used, beginning in November 1973, to evaluate potato breeding lines from federal and state programs.

MAINE

D. C. Merriam and F. E. Manzer

Spindle Tuber Resistance

Annual progress summaries of this work are delayed one year because of the necessity for replanting inoculated seedlings to obtain disease readings. As in recent years, only selections showing commercial promise in previous plantings are included. Entries are inoculated by the top switching method in four two-hill lots, and a tuber from each hill is harvested for the disease reading.

In 1972 selections tested were obtained from Dr. R. V. Akeley of the Maine Agricultural Experiment Station. The 20 entries inoculated included: 10 "BR" numbers, four "B" numbers; two "Ca" numbers; and Norchip. All Kennebec checks were found to be completely infected in all replications and none of the selections were found to be completely free of the disease.

Spindle Tuber Resistance Test 1972

Pedigree Number	Rep. I	Rep. II	Rep. III	Rep. IV
BR6863-15E	2/2	2/2	2/2	2/2
BR6863-8E	2/2	2/2	2/2	2/2
BR6863-11E	2/2	2/2	2/2	2/2
BR7070-3	2/2	2/2	2/2	2/2
BR7083-3	2/2	2/2	2/2	2/2
BR7093-12	1/2	1/2	1/2	2/2
BR7093-20	2/2	1/2	2/2	2/2
BR7093-22	0/2	2/2	2/2	1/2
BR7104-10	2/2	2/2	2/2	2/2
B6952-14	2/2	2/2	2/2	2/2
B6952-15	2/2	0/2	2/2	1/2
B6995-10	2/2	2/2	2/2	2/2
B6987-132	2/2	2/2	0/2	2/2
BR7051-16	2/2	2/2	2/2	2/2
BR7093-48	2/2	2/2	2/2	2/2
BR7106-29	2/2	2/2	2/2	2/2
BR7117-10	2/2	2/2	2/2	2/2
Ca60-24	2/2	2/2	2/2	2/2
Ca61-3	0/2	2/2	2/2	2/2
Norchip	2/2	2.2	1/2	2/2

Kennebec checks showed 100% infection

MAINE

D. C. Merriam and F. E. Manzer

Ring Rot Resistance

The results of these annual tests are reported one year behind in order that tubers of selections appearing disease-free or questionable in the field can be checked after a storage period of five or six months. As in recent years these tests are conducted only on selections shown in previous plantings to have commercial promise. Entries are replicated four times in five-hill lots and inoculation is accomplished by dipping freshly cut seedpieces in a slurry made by grinding the vascular tissue of diseased tubers. Katahdin is used as the susceptible check unless otherwise stated.

In 1972 only 18 selections were inoculated, none were completely free of disease symptoms in the field and seven were saved for examination after storage. Plant and tuber readings of these seven are shown in Maine Table 1. Katahdin checks showed 72% infection.

Maine Table 1. Advanced selections showing low disease incidence in ring rot inoculation tests--1972.

Amount of disease by replication^{1/}

Pedigree Number	Plants I	Tubers	Plants II	Tubers	Plants III	Tubers	Plants IV	Tubers
B7602-2	-	-	2/5	-	4/4	-	0/5	3/21
B7602-7	-	-	1/4	3/13	2/5	-	2/5	-
B7659-15	0/5	3/12	3/5	-	5/5	-	1/5	2/17
B7659-17	2/5	-	5/5	-	1/5	3/22	3/5	-
B7659-19	?/5	1/14	5/5	-	?/5	0/19	?/5	4/16
B7678-1	1/5	3/14	5/5	-	3/3	-	-	-
B7678-17	5/5	-	1/5	2/10	2/5	-	1/5	2/23

^{1/} Numerator = number diseased
 — Denominator = number examined

MAINE

Hugh J. Murphy and Michael J. Goven

Cooperative variety trials with 28 entries were conducted in 1973 at Presque Isle and Grand Isle, Maine. Cold weather and wet soil conditions at planting time were followed by a very dry July and August. These conditions were unsatisfactory for high yields.

Plots at all test locations were single rows, 25 feet long with six replicates per variety. Planting, killing and harvest dates, seedpiece spacing, and fertilizer used at each location are presented in Maine Table 5.

Yields and specific gravity for the varieties grown at both locations are presented in Maine Table 1. The six top yielding varieties were: B6097-9, Cascade, Iopride, Sioux, B6139-11, and BR6626-5. The five highest ranking varieties in specific gravity were: Cariboo, B6044-14, B6097-9, B6139-11, and BR6491-1. Of the 28 varieties grown at Presque Isle, 27 had specific gravities of 1.075 or higher and at Grand Isle, 18 of the varieties grown were 1.075 or higher, which indicates the influence of low moisture at harvest time on higher dry matter accumulation in tubers.

Size determinations for two market-size classes are presented in Maine Table 2. Several varieties grown at both locations produced high percentages of small-size tubers, namely: Cascade, Sioux, BR6820-26, F6208, and Shurchip. In general, tuber sizes were more favorable at Grand Isle than at Presque Isle because of a better soil moisture condition and slightly longer growing season.

Results of the first chipping and french fry tests are presented in Maine Tables 3 and 4, respectively. Cariboo, Penn-71, B6097-9, B6139-11, BR6863-3, and BR7093-20, grown at Presque Isle, had satisfactory chip color (7.0 or less). At Grand Isle, Penn-71, B6139-11, BR6863-3, BR7083-3, and BR7093-20 had satisfactory chip color. All except three of the 28 varieties grown at Presque Isle made satisfactory french fry color, and all varieties had satisfactory french fry texture.

More details of the Maine Cooperative Variety Trials are presented in the annual Maine, New Hampshire, Vermont Potato Variety Trial Report for 1973, which is available from Public Information and Central Services, University of Maine, Orono, Maine 04473.

Maine Table 1. Yield and specific gravity of potato varieties grown at Presque Isle and Grand Isle, Maine - 1973

Variety	Presque Isle		Grand Isle	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
Cariboo	312	1.096	293	1.087
Cascade	322	1.090	394	1.067
Cobbler	233	1.080	304	1.072
Iopride	337	1.082	336	1.065
Katahdin	284	1.081	295	1.070
Kennebec	309	1.082	318	1.074
Nampa	309	1.090	230	1.075
Nooksack	207	1.086	229	1.078
Penn-71	319	1.087	315	1.074
Russet Burbank	278	1.087	266	1.080
Shurchip	320	1.077	325	1.067
Sioux	310	1.093	361	1.079
Targhee	295	1.083	268	1.078
York	196	1.085	257	1.078
B6044-14	298	1.100	343	1.084
B6097-9	358	1.098	381	1.080
B6139-11	323	1.098	341	1.076
BR6456-1	210	1.071	294	1.066
BR6491-1	198	1.089	215	1.086
BR6626-5	348	1.090	314	1.074
BR6820-26	265	1.079	344	1.064
BR6862-2	296	1.090	322	1.076
BR6863-3	224	1.091	270	1.080
BR6864-1E	228	1.071	351	1.069
BR7083-3	190	1.081	260	1.072
BR7093-20	214	1.093	243	1.075
BR7103-2	265	1.088	228	1.071
F6208	280	1.087	331	1.079

Maine Table 2. Percentage of yield between 1-7/8 and 4 inches in diameter for varieties grown at Presque Isle and Grand Isle - 1973.

Variety	Presque Isle		Grand Isle	
	1-7/8 to 4 inches	2-1/4 to 4 inches	1-7/8 to 4 inches	2-1/4 to 4 inches
Cariboo	92.6	65.3	91.8	65.3
Cascade	77.0	52.3	91.6	73.8
Cobbler	94.9	69.2	92.3	68.9
Iopride	97.1	88.7	95.8	78.9
Katahdin	97.4	83.2	90.0	89.0
Kennebec	84.4	50.3	94.2	83.8
Nampa	38.4% 4 to 10 ounce		51.6% 4 to 10 ounce	
Nooksack	96.5	81.7	93.3	81.5
Penn-71	97.2	82.5	90.7	82.2
Russet Burbank	53.5% 4 to 10 ounce		58.9% 4 to 10 ounce	
Shurchip	66.8	52.0	92.8	71.2
Sioux	76.7	50.4	94.9	79.9
Targhee	48.7% 4 to 10 ounce		53.9% 4 to 10 ounce	
York	94.7	62.5	91.8	62.5
B6044-14	92.6	68.0	93.7	73.8
B6097-9	94.1	61.9	91.2	59.6
B6139-11	92.0	71.3	92.1	73.3
BR6456-1	94.3	78.5	94.1	64.1
BR6491-1	93.6	70.0	91.9	66.7
BR6626-5	95.1	82.2	89.5	74.3
BR6820-26	70.1	42.9	90.5	69.7
BR6862-2	86.7	48.2	96.2	83.7
BR6863-3	82.1	36.4	94.8	81.2
BR6864-1E	92.7	62.4	91.1	68.1
BR7083-3	87.3	48.9	88.0	63.8
BR7093-20	77.5	34.6	94.6	76.4
BR7103-2	80.7	43.0	94.0	77.7
F6208	77.1	46.6	94.9	81.8

Maine Table 3. Chip color indices for potato varieties grown at two locations in Maine - 1973 ^{1/}

Variety	Presque Isle	Grand Isle
Cariboo	6.8	7.2
Cascade	9.4	10.0
Cobbler	10.0	9.2
Iopride	7.4	8.8
Katahdin	7.9	8.7
Kennebec	7.8	9.0
Nampa	9.1	9.6
Nooksack	7.7	8.6
Penn-71	6.5	5.8
Russet Burbank	8.5	8.3
Shurchip	7.8	7.6
Sioux	8.0	9.8
Targhee	9.6	9.6
York	7.5	7.4
B6044-14	7.9	9.0
B6097-9	7.0	8.6
B6139-11	6.2	6.2
BR6456-1	9.8	9.2
BR6491-1	7.2	7.1
BR6626-5	9.3	9.4
BR6820-26	9.0	8.8
BR6862-2	7.4	7.8
BR6863-3	5.2	5.6
BR6864-1E	8.6	8.0
BR7083-3	7.4	6.8
BR7093-20	3.7	5.5
BR7103-2	7.7	8.7
F6208	9.1	8.9

^{1/}Chips with lower index numbers are lighter in color.

Maine Table 4. French fry color and texture indices for potato varieties grown at Presque Isle, Maine - 1973.

Variety	Color Index <u>1</u> /	Texture Index <u>2</u> /
Cariboo	1.3	1.1
Cascade	2.7	1.0
Cobbler	4.1	1.0
Iopride	1.5	1.2
Katahdin	1.9	1.1
Kennebec	1.9	1.1
Nampa	3.0	1.1
Nooksack	1.3	1.1
Penn-71	1.0	1.0
Russet Burbank	3.0	1.0
Shurchip	2.2	1.1
Sioux	2.0	1.2
Targhee	3.0	1.0
York	1.7	1.0
B6044-14	1.8	1.0
B6097-9	2.0	1.0
B6139-11	1.0	1.0
BR6456-1	4.5	1.0
BR6491-1	1.7	1.0
BR6626-5	3.4	1.0
BR6820-26	2.8	1.0
BR6862-2	1.4	1.0
BR6863-3	1.0	1.0
BR6864-1E	2.4	1.0
BR7083-3	1.5	1.0
BR7093-20	1.0	1.0
BR7103-2	2.4	1.1
F6208	3.4	1.0

1/French fries with lower index numbers are lighter in color.

2/Lower texture indices indicate mealier texture.

Maine Table 5. Pertinent information about Maine Cooperative Potato Variety Trials - 1973.

	Presque Isle	Grand Isle
<u>Planted</u>	May 9	May 12
<u>Killed</u>		
Early varieties	August 17	September 4
Medium varieties	August 27	September 14
Late varieties	September 4	September 25
<u>Harvested</u>		
Early varieties	August 27	September 14
Medium varieties	September 6	September 24
Late varieties	September 14	October 4
<u>Fertilization</u>		
Pounds per acre	120-120-120	150-225-225
<u>Seedpiece spacing</u>	<u>1/</u>	<u>1/</u>

^{1/} Seedpieces of Russet Burbank were spaced 16 inches apart; all other varieties spaced 8 inches.

MICHIGAN

N. R. Thompson and R. W. Chase

Segregating Populations

Two hills of seedlings from 40 crosses were planted in the field at East Lansing for initial evaluation. The tops were killed early to avoid aphid-transmitted viruses. Selections were made for increase on the Montcalm Experimental Farm in 1974.

In addition 9 test crosses for high total solids and yellow flesh were grown out for 1974 trials.

Variety Evaluations

Seventeen varieties were tested for adaptation to the Michigan environment in six locations. The summary of planting and harvest dates was as follows:

<u>County Location</u>	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Days</u>
Allegan	May 9	September 27	141
Bay	May 8	August 31	115
Emmet	May 19	September 25	129
Montcalm Exp.Farm	May 10	September 20	133
Presque Isle	May 15	September 11	119
Van Buren	May 7	September 7	123

Table 1 summarizes the results of all the locations and Table 2 summarizes the yield and specific gravity data for each of the locations. There was a very definite variation in yield performance between locations with the Allegan and Van Buren locations producing the highest yields and the Bay and Emmet locations producing the lowest. The role of the fertilization factor was uncertain but there was a very definite weather influence between trials. In Bay County heavy rains occurred at planting and in the early growing season. In Emmet County there was an extended period of hot, dry weather in July and August which no doubt reduced yield potentials. In Presque Isle County excessive rains occurred in July and also late in the season which probably accounted for the much lower specific gravity readings.

Culinary qualities were evaluated to determine after cooking darkening. Tubers from each variety and two locations, Allegan and Montcalm Experimental Farm, were cooked by steaming for approximately 35 minutes. Ratings as to the degree of after cooking darkening were made immediately after cooking, at 1 hour and at 24 hours after cooking. After the samples were rated at 1 hour they were stored in a refrigerator and rated again at 24 hours. Ratings are based on a 1-5 scale with a 1 representing no flesh discoloration and a 5 being completely darkened. Table 3 summarizes these data. Additional samples have been stored at 40° and will be scored after storage in March.

Michigan Table 1. The average yield, size distribution, maturity and quality of several potato varieties grown at six locations.

Variety	Total Yield (Cwt/A)	Marketable Yield (Cwt/A)	Percent Size Distribution			Specific Gravity	Chip ¹ / Rating	Maturity ² / Class
			-1 7/8"	+3 1/4"	-1 7/8-3 1/4"			
Hudson	480	457	5.7	22.4	71.9	1.074	4.9	3.5
Katahdin	478	450	6.9	18.8	74.3	1.075	3.5	3
MS-709	459	437	5.5	26.5	68.0	1.071	4.5	3
Onaway	431	408	5.8	27.9	66.3	1.065	7.1	2
MS-503	435	404	7.8	12.6	79.6	1.078	3.5	3
Abnaki	410	386	4.7	17.6	75.7	1.070	4.3	3
ND7196-18	414	362	16.0	4.9	79.1	1.071	2.6	3
Rushmore	372	356	5.1	18.5	76.4	1.067	3.3	1.5
Superior	377	353	7.2	16.0	76.8	1.074	3.1	2
Jewel	373	335	12.0	11.4	76.6	1.082	2.8	3
Targhee	378	331	14.9	11.3	73.8	1.081	6.8	4
Hi Plains	343	314	10.3	8.3	81.4	1.072	2.3	3
Norchip	346	302	14.5	7.2	78.3	1.077	3.0	2.5
ND6925-13	342	286	18.9	4.1	77.0	1.073	5.2	3
MS-1111-2	310	282	9.5	11.1	79.4	1.065	4.2	2
Nampa	3.6	276	14.8	9.2	76.0	1.082	4.8	4.5
York	246	209	16.0	5.4	78.6	1.075	2.4	1

¹/ Based on a color reference standard of 1-10 prepared by the Potato Chip Institute International. The higher the number the darker the chip and the less acceptable. Generally a rating of 204 is most desirable for the Michigan area.

²/ Based on a scale of 1-5. 1 is the earliest maturity similar to the Irish Cobbler.

Michigan Table 2. The marketable yield and specific gravity of several potato varieties grown at each of 6 locations.

	Allegan		Bay		Emmet		MEF		Presque Isle		Van Buren	
	Cwt/A	S.G.	Cwt/A	S.G.	Cwt/A	S.G.	Cwt/A	S.G.	Cwt/A	S.G.	Cwt/A	S.G.
Hudson	643 (2)	1.068	256 (7)	1.073	293 (3)	1.091	484 (1)	1.077	376 (8)	1.064	694 (1)	1.073
Katahdin	727 (1)	1.075	303 (2)	1.075	303 (1)	1.089	432 (3)	1.079	420 (3)	1.061	515 (6)	1.073
MS-709	613 (3)	1.065	279 (6)	1.072	290 (4)	1.077	460 (2)	1.078	426 (2)	1.062	558 (4)	1.072
Onaway	541 (7)	1.063	312 (1)	1.066	245 (5)	1.069	396 (4)	1.068	381 (7)	1.057	576 (1)	1.069
MS-503	597 (4)	1.079	282 (4)	1.075	296 (2)	1.082	378 (5)	1.083	393 (6)	1.070	482 (7)	1.076
Abnaki	562 (5)	1.066	293 (3)	1.071	228 (8)	1.075	298 (12)	1.077	407 (5)	1.061	529 (5)	1.071
ND7196-18	521 (8)	1.069	218 (12)	1.073	136 (15)	1.075	379 (4)	1.077	342 (11)	1.061	580 (2)	1.071
Rushmore	515 (9)	1.060	281 (5)	1.073	214 (11)	1.073	359 (8)	1.070	332 (12)	1.060	435 (11)	1.067
Superior	504 (10)	1.068	229 (10)	1.075	228 (7)	1.082	276 (14)	1.078	412 (4)	1.069	474 (8)	1.073
Jewel	398 (13)	1.079	242 (9)	1.085	158 (12)	1.088	365 (7)	1.091	441 (1)	1.068	410 (14)	1.079
Targhee	557 (6)	1.076	156 (17)	1.073	236 (6)	1.095	329 (10)	1.089	250 (15)	1.070	463 (10)	1.083
Hi Plains	382 (14)	1.070	212 (13)	1.077	154 (14)	1.073	335 (9)	1.078	359 (10)	1.062	443 (12)	1.071
Norchip	490 (11)	1.073	245 (8)	1.082	156 (13)	1.078	251 (16)	1.085	368 (9)	1.069	---	---
ND6925-13	326 (16)	1.070	209 (14)	1.076	122 (17)	1.082	293 (13)	1.077	295 (14)	1.064	471 (9)	1.071
MS-1111-2	335 (15)	1.062	228 (11)	1.067	225 (9)	1.068	312 (11)	1.069	312 (13)	1.060	---	---
Nampa	413 (12)	1.072	158 (16)	1.083	218 (10)	1.097	254 (15)	1.087	197 (17)	1.068	421 (13)	1.086
York	300 (17)	1.064	168 (15)	1.078	131 (16)	1.082	197 (17)	1.081	212 (16)	1.070	251 (15)	1.073
Location												
Average	495	1.069	239	1.075	213	1.081	341	1.079	348	1.064	486	1.074

() The rank by yield of each variety.

Michigan Table 3. The ratings* of several potato varieties for after cooking darkening at 0, 1 and 24 hours after cooking.

	After cooking		1 Hour		24 Hours		Average
	Allegan	MEF	Allegan	MEF	Allegan	MEF	
Hudson	2	2	2	2	2	2	2.0
Katahdin	2	2	2	2	2	2	2.0
MS-709	1	2	1	2	1	2	1.5
Onaway	2	2	2	3	4	3	2.7
MS-503	1	1	1	1	1	2	1.2
Abnaki	2	1	2	2	2	2	1.8
ND7196-18	1	2	2	3	2	4	2.3
Rushmore	1	2	2	2	2	4	2.2
Superior	2	2	2	3	3	3	2.5
Jewel	2	1	2	1	2	1	1.5
Targhee	2	2	3	2	5	4	3.0
Hi Plains	2	2	3	2	3	2	2.3
Norchip	2	2	3	2	4	2	2.5
ND6925-13	1	1	3	2	3	3	2.2
MS-1111-2	2	2	3	2	3	3	2.5
Nampa	2	1	2	2	4	2	2.2
York	1	2	3	3	4	4	2.8

* Ratings based on a 1-5 scale with a 1 representing no discoloration and a 5 being completely darkened.

Hudson - a new variety released by New York in 1973. Its resistance to golden nematode is projected to replace Katahdin on Long Island. It exhibited a high yield potential, however, there was a tendency to roughness. Considerable pink eye and off-type were noted at the Bay County location.

Katahdin - used as a standard late variety for comparisons. It performed well at all locations.

MS-709 - a Michigan seedling which continues to have a high yield potential. Its maturity is similar to a Katahdin with a lower specific gravity.

Onaway - included as a standard early variety.

MS-503 - This Michigan seedling performed exceptionally well this year compared to earlier tests. Its maturity is similar to 709, however, its specific gravity and chip ability appear to be better. It rated the best in terms of absence of any after cooking darkening.

Abnaki - a 1970 release by the U.S.D.A., New York and Maine, it has demonstrated an above average yield potential. Its gravity was low and it was not a good chipping variety. Although not always observed in our trials, some growers have reported hollow heart.

ND 7196-18 - a round white North Dakota seedling. It is more long to oblong in shape than was the Norchip and set a large number of tubers. This is evidenced by the high percentage of B size tubers and the low percentage of tubers over 3-1/4 inch. The specific gravity appears lower than Norchip.

Rushmore - an older variety released in 1956 by Louisiana. It is an early maturing long russet type with low specific gravity. It was included in the 1973 trials for consideration as a variety for the early frozen processing market.

Superior - included as a standard comparison variety.

Jewel - relative yields in 1973 were lower than previous years. It does have a high yield potential, high specific gravity and is an excellent chipping variety. Some pitted scab noted at Bay County location.

Targhee - a new release from Idaho in 1973. It is a long russet type variety, later maturity than Katahdin but with high specific gravity. It did not produce an acceptable chip. There was a high percentage of B size tubers which perhaps relates to its lateness in maturity, particularly at the trials harvested earlier. This variety rated the poorest in terms of after cooking darkening.

Hi Plains - is a 1965 release from Nebraska. It was included in our 1967 and 1968 trials where it was above average in yields. It is a long tuber with a white to slightly russeted skin. Its maturity is similar to Katahdin and medium to low in specific gravity. It made very acceptable chips.

Norchip - included as a comparison variety. Yields in nearly all locations were below average. Poor stands and vigor were noted in some plots.

ND 6925-13 - an unreleased North Dakota round russet. Yields were very low and the percentage of B size tubers was the greatest of those tested. It set a large number of tubers which did not size adequately. It was medium low in specific gravity and was undesirable as a chipping potato.

Ia 1111-2 - a Michigan seedling which matures very early, however, yields and specific gravity are well below average.

Nampa - released by Idaho in 1973 at same time as Targhee. Its performance in the two years of Michigan trials has been undesirable. Specific gravity readings are high. It is a late maturing potato. Tuber shape was variable with a tendency to produce off-type tubers.

York - a Canadian variety which has been in our trials 3 years. It has a very early maturity, earlier than Onaway. However, yields are below average. It does not appear to be well suited to Michigan conditions.

MISSISSIPPI

Delta Branch Experiment Station--Stoneville

James M. Cannon

Irish Potato Variety and Advanced Breeding Line Trials

The 1973 trials were planted on February 24 in a Bosket silt loam soil. Two days prior to planting a fertilizer application of 80-20-20 pounds of $N-P_{2O_5}-K_2O$ per acre was made approximately 8 inches below the top of the seedbed in two drills. Thimet was applied just prior to planting at the rate of 30 lbs. per acre (3 lbs. Ai/A) for insect control. The seedpieces were spaced 12" apart in the row, and the rows were 40" apart with one-row plots 30 feet in length; four replications were used. Enide was applied February 26 at the rate of 5 lbs. Ai/A for weed control. Two applications of Sevin and Maneb were made for insect and disease control, and one application of Thiodan was made for aphid control. During the growing season 24.3" of rain fell, and no supplemental irrigation was necessary. The test was cultivated and laid by on April 30. The plots were harvested with a commercial one-row potato digger on June 4 comprising a 100-day growing season. After harvest the potatoes were washed and graded and weights recorded. Specific gravity readings were made on 8 lbs. of potatoes on June 6. After this, visual observations as to skin color, shape, smoothness, eye depth, and size were made and recorded. Samples from each entry were chipped, boiled, and canned, and appropriate evaluations were made.

Results of Replicated Trials. Forty-two entries were included in the replicated trial with six named varieties, and the remainder was advanced breeding lines from U.S.D.A., Campbell Soup Company, and Louisiana State University. Three lines from Louisiana State University were included for observation. The yield ranged from 313 hundred weight (cwt) for the variety Alamo to 137 cwt (Table 1). The average marketable yield was 237 cwt. with 191 cwt. #1's and a mean specific gravity of 1.0807. The specific gravities ranged from a high of 1.0931 (BR6863-8E) to a low of 1.0709 (L71-82) indicating that all specific gravities were over 1.070. Table 2 presents the yield and specific gravity for the three lines from Louisiana State University. The entry LO-152 produced 271 cwt. of marketable tubers with a specific gravity of 1.075.

Mississippi Table 1. Graded yield and specific gravity for the
1973 replicated trials - Stoneville, Miss.^{1/}

Entry	Total Mkt. Yield (cwt)	#1's	#2's	#3's	Culls	Specific Gravity
Alamo	313	232	90	7	0.17	1.0710
B7629-3 ^{2/}	309	251	38	11	0.52	1.0740
BR6863-8E	308	179	48	16	0.31	1.0931
BR7091-1	295	261	28	6	--	1.0690
BR6864-1E	284	247	30	7	--	1.0765
B6097-9	278	176	79	23	--	1.0859
BR6626-5	275	215	47	13	1.20	1.0797
Kennebec	274	180	33	10	--	1.0785
B7620-4	274	229	37	8	0.17	1.0812
BR7108-2	272	232	34	7	--	1.0884
Ca 02-8	264	223	36	7	--	1.0731
Red LaSoda	264	240	19	5	0.31	1.0740
BR6820-26	257	197	47	13	0.31	1.0761
BR7108-3	256	212	37	8	--	1.0844
Superior	251	216	30	5	--	1.0785
BR6446-2	251	226	20	5	0.94	1.0785
Norchip	250	221	22	8	0.17	1.0820
L71-82	248	222	21	5	0.16	1.0709
BR7103-1	244	220	20	4	0.26	1.0799
BR7044-2	241	180	44	17	--	1.0787
B7649-5	240	212	22	5	0.16	1.0822
BR7105-10	240	204	30	5	--	1.0792
BR7096-1	231	202	23	6	--	1.0852
BR7093-23	230	194	29	6	--	1.0821
BR7066-1	221	177	37	8	0.31	1.0724

Mississippi Table 1. (continued)

Entry	Total Mkt. Yield (cwt)	#1's	#2's	#3's	Culls	Specific Gravity
B7664-2	220	159	51	10	--	1.0819
BR7103-7	217	207	8	1	3.65	1.0851
LaChipper	210	188	19	3	1.46	1.0820
B6516-15	209	164	38	7	--	1.0846
B7572-2	208	169	41	9	0.17	1.0900
B7573-3	207	119	69	19	0.26	1.0790
BR7093-5	207	190	13	4	2.92	1.0820
Ca 02-8	206	167	31	8	1.88	1.0751
BR7105-14	206	149	47	11	--	1.0784
B7572-4	197	151	35	11	--	1.0851
B7654-12	195	167	72	18	1.31	1.0812
B7589-9	195	151	35	10	--	1.0929
BR7089-1	194	161	27	7	0.47	1.0737
B6532-14	191	87	89	15	--	1.0926
B7619-15	139	134	37	7	--	1.0916
BR7270-5	137	144	26	6	--	1.0795
\bar{X}	237	191	38	8.6	--	1.0807
LSD 5%	58	40	31	4.0	--	0.0040
Observational lines:						
L0-152 ^{3/}	271	234	28	9	--	1.075
L7-110	254	207	23	5	--	1.071
L91-237	221	190	25	6	--	1.075

1/ Average of four replications

Planted: 2/24/73

Harvested: 6/4/73

Fertilizer: 80-20-20 applied 8/22/73

Insecticide: Thimet 3 lbs Ai/A applied in open drill just prior to planting

Herbicide: Enide - applied 2/26/73

2/ Entries preceded by "B" are from USDA; "BR" and "Ca" from Campbell Soup Company; and "L" from Louisiana State University.

3/ Average of two replications.

Mississippi Table 2. 1973 Potato Chip Evaluations.

Entry	Visual ^{1/} rating	Hunter Color Readings			
		L	a	b	a/b
Red LaSoda	5.00	61.23	2.62	21.62	.12
La Chipper	4.00	61.97	2.33	21.50	.11
BR-6446-2	4.75	65.20	2.44	21.48	.11
BR-6626-5	5.25	58.97	3.89	20.85	.19
BR-6820-26	4.50	57.82	2.84	20.87	.14
BR-6863-8E	3.50	65.42	- .49	21.59	---
BR-6864-1E	3.50	62.82	- .30	19.78	---
BR-7044-2	4.75	64.00	1.52	21.37	.07
BR-7066-1	5.25	61.84	3.72	21.67	.17
BR-7072-5	5.50	60.19	3.44	21.40	.16
BR-7089-1	4.25	62.52	.15	21.30	.007
BR-7091-1	4.00	63.89	.57	19.75	.03
BR-7093-5	4.00	62.05	1.74	19.72	.09
BR-7093-23	3.50	62.94	1.50	21.67	.07
BR-7096-1	4.00	58.32	2.27	20.78	.11
BR-7103-1	3.75	62.17	1.88	21.25	.09
BR-7103-7	4.25	62.67	1.02	20.82	.05
BR-7105-10	3.50	62.58	1.30	20.52	.06
BR-7105-14	5.25	60.27	1.50	20.72	.07
BR-7108-2	3.75	61.10	2.20	21.32	.10
BR-7108-3	4.00	59.17	2.77	21.50	.13
Ca 02-8	4.50	62.12	2.17	20.35	.11
Ca 02-13	3.75	62.17	2.55	21.17	.12
Alamo	4.73	60.73	3.07	21.75	.14
Norchip	3.00	63.25	1.70	20.60	.08
Kennebec	3.75	65.15	2.00	20.48	.10
Superior	3.75	62.37	1.65	20.32	.08
B-6097-9	4.50	60.77	1.79	20.74	.09
B-6516-15	3.75	61.74	1.90	20.50	.09
B-6532-14	4.25	61.39	1.64	20.34	.08
B-7572-2	5.50	60.78	2.77	21.10	.13
B-7572-4	6.25	59.93	3.65	22.09	.17
B-7573-3	4.00	59.62	2.15	19.60	.11
B-7589-9	4.50	63.09	1.42	21.29	.07
B-7619-15	4.00	61.99	2.10	21.92	.10
B-7602-4	5.25	59.85	3.02	20.02	.15
B-7629-3	4.75	60.77	2.65	20.48	.13
B-7649-5	4.50	60.37	3.07	20.88	.15
B-7654-12	4.25	60.24	2.29	20.92	.11
B-7664-2	4.25	62.14	2.74	22.02	.12
L71-82	4.25	58.50	2.59	20.59	.13
\bar{X}	4.35	61.56	2.09	20.94	.10

^{1/} Rated by comparing chip color with the chip color reference sheet.

NEBRASKA

R. B. O'Keefe

Potato Genetics and Breeding

Heat and Drought Resistance - Heat and drought resistance and related plant factors among species, families, clones and within clones were studied for the fourth year using standard heat chamber tests (120°F., 4 hrs., 60-70% RH). Degree of wilt, secondary growth, plant height and leaf area were measured and correlated with permanent plant damage. Sixty species, 3 to 10 families per species and 2 to 10 clones per family have been evaluated from the IR-1 Potato Introduction Collection. As previously reported, sources of resistance were found within S. berthaultii, S. cajamarcense, S. guerreroense, S. chacoense, S. microdontum and S. sogarandinum. The combined data for the four years are being analyzed to obtain estimates of interspecific and intraspecific genetic variability and heritability for heat resistance and the related plant factors.

Verticillium and Fusarium Resistance (Oscar S. Malamud) - In 1972, 32 species, 60 families and 2 to 5 clones per family were tested for V. dahliae and F. solani f. eumartii reactions. In 1973, tests were repeated using 55 species, 189 families and 14 clones per family. The populations were obtained from the IR-1 Station. Also, 10 families from 5 crosses between S. phureja (male) and the varieties Katahdin and Chippewa were obtained from the University of Wisconsin and tested in 1973. One family from each cross consisted of diploid ($2x=24$) individuals and the second family of tetraploid ($2x=48$) plants. Twenty-five to 65 clones per family were inoculated. The "toothpick" inoculation method was used for testing purposes. The objectives of the studies are: 1) to identify sources of resistance and 2) to study the genetic nature of resistance in species at various ploidy levels. The manuscript is being prepared as a Ph.D. thesis.

Gametic and Zygotic Genetic Variation - The data for 19 vine, floral and tuber characteristics for $2n$ and $S1$ populations from Ag.-231, Chippewa, Katahdin and Merrimack do not lend themselves to a single computer program. The data are those obtained in Minnesota, Nebraska and Wisconsin from 1965 through 1968. The data will be handled for each character separately within and (where possible) between locations. Stem type, terminal leaflet shape, terminal leaflet base, calyx length, flower color, pollen fertility, style length, tuber set, tuber shape and scab type are being considered as qualitative type characters on the basis of the nature of frequency distributions for them. Genetic ratios and correlations among characters (apparent linkages) are to be calculated. Quantitative inheritance is being assumed for plant vigor, leaflet size, flower number, yield, specific gravity and scab type. Least squares programs will be used to obtain components of variance and heritability estimates for these characters.

Heritability and Repeatability for Quality Factors - Studies conducted in this area are contributing to NCM-45, Post-harvest Market Quality of Processing Potatoes.

Samples of 53 potato varieties and selections grown in 1970, 1971 and 1972 North Central States trials (11 States) were evaluated for 12 factors associated with market and processing quality of potatoes. Similar data are being obtained for samples of 18 selections from the North Central States trials in 1973. The data yielded estimates of the relative importance of genotype, environmental and interaction effects associated with each of the quality factors. Heritability and repeatability estimates were obtained using 1970 and 1971 data. Heritability values for total sugars and chip color were high (0.38 and 0.40); values for total solids and reducing sugars were intermediate (0.19 and 0.22). A negative genotypic variance component was obtained and heritability was not estimated for protein content. Repeatability indicates the probability of repeated performance of a genotype at a location within the North Central Region since potatoes are asexually propagated. Repeatability values were high for all factors except protein content and ranged from 0.61 to 0.86. Since the potato is asexually propagated the total genotypic effect of a clone can be reproduced. Consequently, the heritability estimates can be used to estimate the genotypic superiority of clones in trials within the North Central Region. Selection indices can also be calculated for estimating the net genotypic superiority of a clone in trials.

Use of True Seedling Transplants for Selection in Breeding Programs - The use of true seedling transplants rather than first clonal generation tubers in the initial field plantings in breeding programs was discussed at the 1972 meeting. The Nebraska program has used this method for 3 years. The 1973 populations included 34 families from crosses involving 5 Nebraska clones with the varieties Antje, Atzimba, Bertita, Conchita, Erendira, Florita, Hansa, Hilda, Juanita and Sangima. True seed for each cross was obtained from the IR-1 Station. Twenty to 100 seedling transplants were obtained for each family. The seed was planted in Jiffy-7 pots in the greenhouse on the first week of April and seedlings transplanted to the field with a peat-pot transplanter on May 31. Plants were spaced 28 inches in the row and 76 inches between rows. Protection from wind was provided by ridging between rows with a 2-row potato planter. The field was furrow irrigated. The plants were hailed twice. Frost occurred on September 16 and the field was harvested with a single-row digger on September 28. One-hundred and four selections were made on the basis of maturity and general tuber characteristics. A comparable population is being grown as true seedlings in the greenhouse this winter to obtain C1 generation seed tubers and will be planted to the field as the C1 generation 1974. The performance and general characteristics of selections from true seedling transplants and the C1 generation tubers will be compared in field trials in 1975 and 1976.

True seedling transplants from 102 F₁ and F₂ families from inter-specific crosses were also included in the 1973 planting. Forty-five commercially acceptable selections were made from the population.

Nebraska Table 1. Mean values for quality factors and heritability and repeatability estimates.

	<u>Total Solids</u>	<u>Reducing Sugars</u>	<u>Total Sugars</u>	<u>PCII Color</u>	<u>Rd. Value</u> <u>1/</u>	<u>Soluble Protein(Dw)</u> <u>2/</u>
<u>Years:</u>						
1970	17.8	0.331	0.674	4.4	37.9	4.67
1971	17.9	0.221	0.480	3.8	42.9	4.94
<u>Locations:</u>						
Louisiana	16.8	-----	-----	---	----	----
Missouri	18.8	0.508	1.155	6.8	28.1	4.66
Kansas	18.4	0.209	0.524	4.3	38.8	4.64
Central Nebr.	17.2	0.283	0.703	4.3	42.6	4.40
Indiana	15.2	-----	-----	---	----	5.09
Ohio	16.9	0.180	0.366	3.1	46.0	5.19
So. Dakota	18.7	0.195	0.393	3.2	53.9	6.51
No. Dakota	20.1	0.294	0.496	4.1	39.6	4.49
Wisconsin	17.6	0.296	0.562	3.9	32.6	4.14
Western Nebr.	18.7	0.244	0.417	3.3	41.6	4.16
Michigan	17.8	-----	-----	---	----	4.71
<u>Varieties:</u>						
Wisc. 634	18.7	0.173	0.456	3.5	43.1	4.59
La. 22-111	17.2	0.276	0.549	4.4	38.6	4.50
ND. 6993-13	18.8	0.195	0.442	3.2	43.8	5.03
ND. 7196-18	18.4	0.146	0.324	3.3	46.4	4.65
Red Pontiac	16.4	0.502	1.002	5.8	31.8	4.77
Irish Cobbler	17.8	0.297	0.626	4.4	40.9	4.71
Norland	17.6	0.345	0.640	4.3	38.1	5.34
<u>Source</u> <u>Analysis of Variance</u>						
Years	ns	*	**	**	**	ns
Locations	*	*	**	**	**	ns
YxL	**	ns	ns	ns	**	**
Genotypes	**	**	**	**	**	ns
GxY	**	ns	ns	ns	*	*
GxL	ns	ns	*	ns	*	ns
Heritability	0.19	0.22	0.38	0.40	0.36	----
Repeatability	0.61	0.78	0.81	0.86	0.80	----

1/ Values above 35 indicate acceptable chip color.

2/ Determined by the Lowry method.

Cultural and Storage Studies

Effects of Cultural Practices and Storage on Quality - A study was initiated in 1971 and continued in 1972 with six potato varieties to evaluate methods of maintaining market (processing) quality and extending the storage life of commercial potatoes. The varieties were Haig, Shurchip, Platte, Hi-Plains, Norchip and Kennebec. The study included 3 planting dates - Mid-May, Early-June, and Mid-June. Plant spacing was 9" x 38". Four weeks before harvest the plants were sprayed with MH-30 (sprout inhibitor) at the recommended rates. All plots were harvested simultaneously on September 17, 1971 and on September 26, 1972 therefore, providing differences in length of growing period and maturity for the different varieties. Table 2 gives the yield and other characteristics of the varieties tested averaged over both years. Total yields and percent U.S. #1's were greater in 1972 than 1971, but the effect of planting date was similar in both years.

The results indicate that total yield was greatest for Mid-May planting and decreased with later plantings, due to a decrease in large oversize tubers for all the entries. The highest yield of potatoes (both total and U.S. #1's) was obtained with Shurchip and the lowest with Hi-Plains.

Platte produced the highest percentage of U.S. #1's. Total solid values were variable with varieties and were not related to general planting dates.

Nebraska Table 2. Effect of planting date on potato yields and quality.^{1/}

Variety	Planting date	Total Yield Cwt/A	US #1 Cwt/A	Percent	
				US #1	Total Solids
				Averages for 1971 and 1972	
Haig	5/21	341	240	70	18.6
	6/7	334	221	65	18.6
	6/18	188	155	82	19.2
	Average	288	206	72	18.8
Shurchip	5/21	425	286	68	19.1
	6/7	393	283	71	18.0
	6/18	271	243	89	18.5
	Average	363	271	76	18.5
Platte	5/21	337	278	81	18.3
	6/7	291	242	83	18.2
	6/18	225	181	81	17.3
	Average	284	234	82	17.9
Norchip	5/21	341	225	64	19.4
	6/7	319	221	68	18.8
	6/18	208	171	82	20.3
	Average	290	206	71	19.5
Hi-Plains	5/21	325	232	71	18.9
	6/7	273	197	72	18.8
	6/18	198	159	79	18.5
	Average	265	196	74	18.7
Kennebec	5/21	395	212	53	19.5
	6/7	292	180	62	18.8
	6/18	241	184	77	17.6
	Average	310	191	64	18.6

^{1/} All varieties for all planting dates were harvested simultaneously on September 17, 1971, and September 29, 1972. Major grade defect was oversize ranging from 4 to 26 percent depending upon variety for the Mid-May and Early-June planting dates.

Nebraska Table 3. Effect of storage temperature and duration on potato processing quality

Variety	Planting dates	At Harvest	Chip color-PCII values			Reconditioned at 60°F		
			After 28 weeks of storage at:			After 28 weeks of storage at:		
			40°F	45°F	50°F	40°F	45°F	50°F
Averages for 1971 and 1972								
Haig	5/21	4	8	8	9	9	9	8
	6/7	4	10	8	9	9	9	9
	6/18	5	9	8	8	9	8	8
Shurchip	5/21	4	8	6	4	6	5	6
	6/7	4	7	6	6	7	6	5
	6/18	6	7	7	6	7	7	6
Platte	5/21	4	7	7	4	8	4	4
	6/7	4	7	6	5	7	5	5
	6/18	6	8	7	6	6	7	6
Norchip	5/21	2	5	4	3	4	3	3
	6/7	2	7	4	3	6	3	4
	6/18	3	5	4	3	4	2	2
Hi-Plains	5/21	4	8	5	6	7	6	4
	6/7	4	7	6	5	6	6	5
	6/18	5	9	7	5	5	6	5
Kennebec	5/21	4	5	3	4	3	4	3
	6/7	4	5	4	5	4	4	4
	6/18	5	4	5	3	6	4	2
Average:		4.1	7.0	5.8	5.2	6.3	5.4	4.9

Following harvest, samples from each variety-planting date combination were stored at three temperatures of 40°, 45°, and 50°F. Temperatures were measured for the air surrounding the tubers. High relative humidity was maintained by wetting the storage room floors when necessary and by use of humidifiers. Flow of air was provided by intermittent functioning of fans. Samples were chipped monthly until May when reconditioning at 60°F was initiated. Samples were chipped following reconditioning at 60° to 65°F for 2, 4 and 6 weeks.

Table 3 shows chip color (PCII values) for the initial samples stored at 50°F until November, the last sampling for each storage temperature after 28 weeks and after 2 weeks of reconditioning at 60°F.

Haig was unacceptable for long time storage at any of the test temperatures. Only Norchip and Kennebec reconditioned in 2 weeks following 40°F storage to make acceptable chips. Platte, Norchip, Hi-Plains and Kennebec stored as well at 45°F as 50°F and chip samples reconditioned to acceptable fry color in 2 weeks.

The color of chips made from monthly samples taken for the various storage temperatures are given in Table 3. All varieties except Haig produced acceptable chips during 28 weeks of storage at 50°F. Chips made from samples of potatoes planted in mid-May were generally lighter throughout the storage period than samples from later planting dates.

The data suggest that Haig should be planted in mid-May and stored at 50°F for marketing through March. Shurchip and Platte should be planted in mid-May and either stored at 50°F or at 45°F until May and then reconditioned.

Planting dates had little effect on the color of chips made from Norchip and Kennebec. Samples of Norchip and Kennebec from 45° and 50°F storage chipped equally well throughout the storage period of 28 weeks. Both varieties reconditioned from 40°F storage to make acceptable chips.

Chip color for samples of Hi-Plains was generally stable over all plantings though the mid-May date may be preferable. The variety should be stored at 50°F.

Cultural Studies with Sprinkler Irrigated Potatoes - Cultural studies to determine the effects of plant spacing and fertilizer rates and ratios on yield, grade, and processing quality of commercial varieties when grown under sprinkler systems were continued for the fourth year.

The early-maturing varieties Haig, Norland, Norgold, and Norchip produced balanced vine growth and high yields of quality tubers with a 1 : 2 fertilizer ratio at a rate of 100 lbs. N to 200 lbs. P (Table 4). Kennebec, Russet Burbank, Shurchip, and Hi-Plains produced optimum yield and quality with a 1 : 1 fertilizer ratio at a rate of 100 lbs. N to 100 lbs. P. Yields and grade quality of all varieties were greater with 30" row spacing than 38" row spacing. Fertilizer treatments and spacing had little effect on specific gravity or chip color.

Russet Burbank, Shurchip, and Norchip were also included in a study to determine the responses of the varieties to fertilizer rates and to two levels of irrigation (45% and 65% available soil moisture), two in-row spacings (9" and 12"), and two types of seedpieces (whole and cut seed). Russet Burbank was the most responsive variety and produced the highest yields and grade quality of potatoes at 65% moisture level, using 12" spacing and whole seed (Table 5). Norchip produced the highest yield of U.S. #1 grade with 9" spacing. Higher yields were obtained at the 100-100-0 level of fertility than the 200-200-0 level.

Nebraska Table 4. Effects of fertilizer rates and ratio on yield and quality.

FERT. (N-P)	VINE WT. Lbs.	YIELD Cwt./A	% US #1 (2 Year Averages)	% SORT OUT (Cuts, Oversize)	% B	SPECIFIC GRAVITY
<u>NORGOLD</u>						
0-0	3.3	126	61	22	16	1.082
50-50	5.6	171	45	37	16	1.086
50-100	9.6	210	46	44	10	1.082
100-100	15.1	166	57	31	11	1.080
100-200	7.0	230	46	44	9	1.079
200-200	20.8	191	42	42	15	1.081
<u>KENNEBEC</u> (Oversize, Sun Green, Rot)						
0-0	4.9	177	23	70	6	1.086
50-50	13.0	272	16	76	7	1.082
50-100	23.2	235	18	77	5	1.083
100-100	34.3	244	13	79	7	1.086
100-200	30.4	246	18	76	6	1.089
200-200	39.9	243	19	75	6	1.079
<u>RUSSET BURBANK</u> (Cuts, Pointed Ends)						
0-0	7.4	144	22	51	26	1.094
50-50	16.9	200	19	58	31	1.087
50-100	17.6	188	9	55	36	1.086
100-100	21.4	202	19	51	29	1.087
100-200	25.1	191	10	68	21	1.093
200-200	23.4	178	11	63	26	1.082
<u>PLATTE</u> (Oversize, Sun Green)						
0-0	5.9	186	51	31	17	1.087
50-50	12.2	228	53	39	7	1.081
50-100	17.1	246	39	51	9	1.090
100-100	28.2	253	54	34	11	1.081
100-200	25.0	242	44	48	7	1.083
200-200	25.1	240	79	12	8	1.076
<u>NORCHIP</u> (Growth Crack, Sun Green)						
0-0	1.0	100	61	22	16	1.082
50-50	7.2	178	32	63	4	1.078
50-100	8.2	100	27	62	11	1.075
100-100	4.6	277	50	43	6	1.079
100-200	7.2	187	21	72	6	1.078
200-200	7.7	148	35	57	7	1.078
<u>SHURCHIP</u> (Oversize, Off-type)						
0-0	1.3	110	74	19	6	1.083
50-50	4.6	238	66	31	2	1.077
50-100	6.9	218	65	31	3	1.074
100-100	6.9	254	66	30	4	1.074
100-200	12.3	227	44	50	5	1.072
200-200	8.8	185	67	28	4	1.069

Nebraska Table 4. Effects of fertilizer rates and ratio on yield and quality.

<u>FERT. (N-P)</u>	<u>VINE WT.</u> Lbs.	<u>YIELD</u> Cwt./A	<u>% US #1</u> (2 Year Averages)	<u>% SORT OUT</u>	<u>% B</u>	<u>SPECIFIC GRAVITY</u>
			<u>HI-PLAINS</u>	(Oversize, Off-type)		
0-0	0.8	84	62	23	13	1.080
50-50	4.5	240	50	44	4	1.081
50-100	6.6	225	56	35	8	1.075
100-100	6.7	203	65	31	4	1.076
100-200	10.5	207	37	55	7	1.074
200-200	13.3	221	58	33	8	1.074
			<u>SIoux</u>	(Oversize, Growth Crack)		
0-0	1.5	95	74	20	5	1.089
50-50	4.3	231	61	33	5	1.083
50-100	6.2	238	62	31	6	1.077
100-100	4.4	244	70	26	3	1.080
100-200	7.5	201	53	41	5	1.080
200-200	8.8	253	66	30	3	1.077
<u>4 YEAR AVERAGES</u>						
			<u>HAIG</u>			
0-0	1.8	111	73	19	9	1.085
50-50	4.5	178	58	33	9	1.085
50-100	7.6	219	65	29	6	1.082
100-100	8.9	176	57	33	9	1.082
100-200	7.0	210	61	31	7	1.083
200-200	10.3	205	69	26	5	1.077
			<u>NORLAND</u>			
0-0	1.6	132	80	14	6	1.078
50-50	4.0	247	71	23	8	1.074
50-100	7.3	205	65	30	5	1.071
100-100	6.5	237	71	21	7	1.074
100-200	7.3	255	62	33	5	1.072
200-200	6.5	245	66	28	5	1.071

Nebraska Table 5. Effect of spacing and type of seed on yield and quality.^{1/}

Variety	Seed and Spacing	Planted May 20			Planted June 5		
		Yield	%US #1	%B-Size	Yield	%US #1	%B-Size
Shurchip	Cut	352	87	5	325	87	6
	Whole	299	81	3	335	87	8
	9"	327	84	4	334	84	8
	12"	324	84	4	326	90	8
Norchip	Cut	295	69	4	344	72	2
	Whole	321	77	5	305	77	6
	9"	299	78	5	286	75	5
	12"	317	67	4	353	74	3
Russet Burbank	Cut	287	73	5	283	78	9
	Whole	253	71	18	310	80	14
	9"	274	66	15	289	78	12
	12"	266	78	9	304	80	11

^{1/} Data presented for the 100-100-0 fertilizer treatment at the 65% available moisture level.

Effect of Malic Hydrazide (MH-30) Sprout Inhibitor on Potato Quality - Commercial growers have experienced losses due to tuber cracking of some new varieties when MH-30 is used as a sprout inhibitor. Tests were conducted in commercial fields (Table 6) and in test plot plantings to determine the effect of rates of MH-30 (0,0.5x,x,2x, and 4x) and solution gallonage applied per acre on yield and quality of 24 varieties.

The varieties Shurchip, Raritan, Superior, Sioux, York, Iopride, Abnaki, Peconic, and Haig were susceptible to recommended or above rates of MH-30. Yields were significantly reduced and tuber damage in the form of severe cracking were experienced with these varieties. Recommended rates of application applied with low gallonage (20-gal/A) was found to increase the injury and yield reduction as compared with a 100 gal/A rate (Table 6).

Nebraska Table 6. Effect of moleic hydrazide sprout inhibitor on yield and tuber quality.

Variety	Yield ^{1/} Cwt./A	Percent Damaged ^{1/} Tubers (by wt.)
Shurchip	- 67	- 3
Norland	+ 25	0
Bounty	+ 88	0
Raritan	- 89	+ 12
Kennebec	- 15	0
Norchip	- 21	0
Cascade	- 20	0
Haig	+ 41	- 1
Russet Burbank	+ 35	0
Superior	+ 17	+ 18
Sioux	- 66	+ 3
York	- 52	- 1
Chieftain	+ 47	0
Jewel	+ 107	+ 3
Iopride	- 30	+ 11
Peconic	- 128	- 9
Abnaki	- 40	0
Monona	+ 57	0
Neb. 93.55-16	- 66	0
Neb. 52.57-1	- 67	- 2
Neb. 1.57-1	- 129	0
Neb. 49.62-5	- 69	+ 11
N.Y. 41 (Hudson)	+ 88	- 1

^{1/} The values in the body of the table for each aspect express respectively reduction (-), increase (+) or no change (0) when 20 gal/A of water was used instead of 100 gal/A to dilute 1 gallon of MH-30 as recommended by the manufacturer.

NEW JERSEY

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Approximately 1,000 first-year seedlings were grown at Perham, Maine from which 1349 clones were selected for replanting in 1974. Twelve hundred and twenty-three clones were planted in 16-hill rows and 212 were saved for processing tests and subsequent planting in 1974. One hundred and fifty-one clones were planted in 100 hill rows and saved for processing tests and selection for replanting.

Data reported are from replicated trials in New Jersey, Pennsylvania, and Maine. Plots consisted of 25 hills spaced at 10 inches and were replicated four times. Planting and harvest dates, fertilization and cultural practices were similar to those for the different areas. Samples were evaluated for processing characters in laboratories at Cinnaminson, New Jersey or Perham, Maine.

Campbell Table 1. Yield, specific gravity, chip color and tuber rating of selections at Shirley, New Jersey - 1973.

Selection	Yield over 2"		Specific ^{1/} Gravity	Chip ^{2/} Color	Tuber ^{3/} Rating
	Cwt./A	%			
BR6491- 1	287	90	85	4.2	3.0
BR6626- 5	257	78	80	4.1	2+
BR6863- 3	337	94	88	4.4	4
BR7072- 5	215	81	81	5.8	3
BR7082- 2	199	82	74	4.8	3
BR7085- 1	266	85	86	5.2	3
BR7088-18	227	88	87	4.3	3
BR7089- 6	234	81	87	3.2	3
BR7093- 5	283	93	78	2.4	3+
BR7093- 9	207	88	70	4.1	3+
BR7093-23	295	89	72	4.1	3+
BR7102- 4	214	83	84	2.8	2+
BR7108- 1	250	88	86	2.2	3
BR7108- 2	324	93	86	2.4	2+
CA25- 3	196	82	72	5.0	3
CA26- 2	205	82	76	5.3	2+
CA26-11	163	81	74	5.5	3
CA28- 2	200	83	79	5.8	3+
CA28-12	176	83	69	7.3	2
CA34- 2	334	86	74	6.5	4
CA40- 6	205	78	85	3.3	3
Catawba (check)	244	87	70	4.8	3
Kennebec	200	88	80	3.3	2+
Superior	272	92	76	5.5	3.0
Mean	246	86	80	4.4	
LSD (.05)	67		5	0.9	

^{1/} 1.0 deleted

^{2/} PCI Color Scale

^{3/} 1 = poor to 5 = excellent

Well Table . Yield, specific gravity, chip color, french fry color and texture and tuber rating for selections at Rural Leaf, Pennsylvania - 1973.

Selection	Yield above 2" Cwt./A	Specific Gravity	Chip Color	French fry Color	French fry Texture	Tuber Rating
6-2	228	77	6.7	3.5	3.5	3+
6-1	230	76	4.8	2.5	3.5	3
26-5	239	83	4.4	3.8	3.0	3+
20-26	247	77	6.5	3.6	3.4	3
50-13E	225	73	5.5	3.3	3.1	3
62-2	241	79	3.7	2.7	3.2	3
63-3	253	87	3.7	1.8	2.8	3+
863-5E	236	83	2.5	1.6	2.5	3
863-8E	244	87	3.1	2.0	2.5	3
63-12E	215	82	3.6	2.6	3.0	3
64-1E	240	74	4.0	2.0	3.1	3
64-5E	263	82	6.0	3.2	3.5	2+
64-9E	285	78	4.7	2.8	2.9	3
64-11E	238	73	6.2	3.9	4.0	3
3-25	169	69	5.9	-	-	4
3-6	209	82	2.4	3.1	3.1	3
-4	264	75	5.3	3.1	2.5	3+
7-11	209	74	4.3	2.6	3.3	3
7-7	254	74	5.4	3.3	4.0	3
-11	306	78	2.7	2.0	3.0	3+
-1	267	74	4.1	2.4	3.0	3+
7-2	324	73	4.9	2.9	4.0	3+
ahdin (check)	288	71	4.4	3.2	3.7	3
Leon	264	75	4.1	3.1	3.6	3
	247	78	4.6	2.8	3.2	
SD (.05)	41	5	0.9	0.6	NS	

.0 deleted 2/ PCI Color Scale 3/ USDA Color Standard 4/ 1 = mealy to 5 = soggy

1 = poor to 5 = excellent

Campbell Table 3. Yield, specific gravity, tuber rating and tuber shape of selections to be evaluated for soups, Perham, Maine - 1973.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Tuber ^{3/} Shape
	Cwt./A	%			
BR6446- 2	319	91	81	3	0
BR6456- 1	308	92	79	3+	A-O
BR6626- 5	334	90	81	4	-LO
BR6820-26	313	85	74	3+	R-O
BR6850-13E	283	87	80	3	0
BR6862- 2	300	97	83	4	0
BR6863- 3	232	94	90	3	ov-O
BR6863- 5E	283	86	91	2+	ov-O
BR6863- 8E	246	84	92	2+	ov-O
BR6863-12E	226	77	85	3	R-O
BR6864- 1E	348	85	82	2+	0
BR6864- 5E	270	85	88	2	0
BR6864- 9E	315	88	81	2+	R-O
BR6864-11E	264	78	82	3	R-O
BR7062- 4	176	79	82	3	R-O
BR7104-10	335	92	78	3+	0
BR7105-14	310	85	81	3+	R-O
CA03-25	205	90	72	4	0
CA23- 6	285	97	86	3	0
CA26- 4	314	95	76	3	0
CA29-11	316	86	85	3+	R-O
CA40- 7	280	88	87	3+	0
CA46-11	303	90	85	4	O-L
CA63- 1	315	95	81	3	
CA67-2	322	95	75	3	
Katahdin (check)	266	93	74	3	ov-O
Wauseon	270	91	80	2+	R-O
Superior	258	93	82	3	
Mean	286	89	82		
LSD (.05)	45		5		

1/ 1.0 deleted

2/ 1 = poor to 5 = excellent

3/ 0 = oblong, R = round, L = long

Campbell Table 4. Yield, specific gravity, tuber rating and tuber shape of selections to be evaluated for frozen products, Perham, Maine - 1973.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Tuber ^{3/} Shape
	Cwt./A	%			
BR6491- 1	205	86	91	4	O
BR6626- 5	310	86	83	4	O
BR6863- 3	215	93	82	3	ov
BR7072- 5	262	81	80	3+	ov-O
BR7082- 2	200	65	80	3+	O
BR7085- 1	231	83	87	3+	O-L
BR7088-18	247	84	91	3	ov
BR7089- 1	219	83	83	3+	O-L
BR7089- 6	247	87	88	3	O-L
BR7093- 5	282	93	80	4	O
BR7093- 9	244	92	81	3+	O
BR7093-23	215	78	77	3+	ov-L
BR7102- 4	255	85	82	3	ov-L
BR7103- 1	298	91	80	4	O-L
BR7103- 7	242	80	81	3	O
BR7108- 1	243	88	84	2	ov
BR7108- 2	244	80	88	2+	ov
CA25- 3	260	87	78	3	O
CA26- 2	292	86	81	3	ov
CA26-11	278	90	77	3	ov-L
CA28- 2	292	83	81	3+	L
CA28-12	330	93	80	4	O
CA34- 2	244	78	78	3+	O
CA40- 6	215	88	84	3+	ov
CA46-31	248	95	72	4	O-L
CA46-34	314	92	78	3	O-L
Katahdin	251	92	75	3+	ov
Kennebec (check)	261	91	80	2+	O-L
Superior	312	95	78	2+	ov
R. Burbank	24	30	82	1	L
Mean	254	85	81		
LSD (.05)	39		5		

^{1/} 1.0 deleted

^{2/} 1 = poor to 5 = excellent

^{3/} O = oblong, R = round, L = long

Campbell Table 5. Yield, specific gravity, tuber rating and tuber shape of selections evaluated for frozen products, Perham, Maine - 1973.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Tuber ^{3/} Shape
	Cwt./A	%			
CA04- 9	267	83	85	2	O-LO
CA26-10	220	73	83	2+	ov-O
CA49- 8	190	68	85	3	LO
BR6835- 5E	218	81	75	3+	L-L
BR6850-23E	196	75	84	2+	ov-O
BR6864-6E	316	92	76	4	ov-O
BR6864- 8E	268	80	80	3	ov-O
CC01-18	227	74	89	2	LO-L
CC06- 5	317	91	83	3+	O
CC06-12	302	82	77	3+	O-LO
AF 9- 4 Rus	207	79	85	3+	O-LO
AF 9- 7 Rus	301	92	81	2+	ov-O
AF10- 8 Rus	257	89	76	3+	LO-L
AF10-20 Rus	286	89	74	2+	ov-O
AF17-13	252	83	80	4	O
AF25- 7	120	69	91	2+	LO-L
AF25-18	292	81	79	4	LO-L
AF25-24	136	54	88	2+	O-L
AF27-36	299	79	86	3	O
Katahdin	297	94	75	3+	ov-O
Kennebec (check)	296	89	77	2+	O-LO
R. Burbank	127	37	79	1	L
Mean	245	79	81		
LSD (.05)	49		4		

1/ 1.0 deleted

2/ 1 = poor to 5 = excellent

3/ O = oblong, R = round, L = long

Campbell Table 6. Yield, specific gravity, tuber rating and tuber shape of selections evaluated for potato chips, Perham, Maine - 1973.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Tuber ^{3/} Shape
	Cwt./A	%			
CA26-13	260	88	77	3	ov-0
CA27- 2	261	79	71	3+	0
CA27-10	237	88	82	2+	ov-0
CA53- 6	292	84	84	2	0
CA55-24	304	92	85	4	0-L0
CA61- 3	285	86	92	2	ov
CC01- 3 Rus	167	77	86	3	0
CC01-22	244	88	81	3	0
CC58- 8	312	91	97	2+	ov-0
AF14- 3	242	78	89	2	ov
AF24-33	290	96	91	3+	0
AF24-53	251	86	85	2	0
BR6863- 8E	256	83	85	2	ov
BR7083- 3	229	78	80	4	0
BR7093- 9	248	95	81	3	ov-0
BR7093-12	216	88	82	3+	0
BR7093-20	245	91	86	2+	ov-0
BR7093-48	247	95	76	3+	0
B6965-10	256	84	94	2	0-L0
B6987-132	212	82	75	2+	0-1C
Kennebec (check)	271	89	77	2+	0-L0
Norchip	290	87	82	2+	ov-0
Mean	255	87	84		
LSD (.05)	52		6		

^{1/} 1.0 deleted

^{2/} 1 = poor to 5 = excellent

^{3/} = oblong, R = round, L = long

Campbell Table 7. Yield, specific gravity, tuber rating and tuber shape of selections in early to medium maturity trial, Perham, Maine - 1973.

Selection	Yield above 2" Cwt./A %		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Tuber ^{3/} Shape
GA91-13 Red	307	87	73	3	O-L
102- 7	281	90	79	3	ov
GA02- 8	367	93	70	3	ov-O
GA02-13	306	92	74	3	O
GA11- 3	229	90	80	3	R-O
GA29- 9	384	95	78	3	ov-C
GA47-12	230	93	74	3	ov-O
GA48-13	241	84	73	3	ov-C
GA70-13	297	86	72	2	O-L
GA72- 6 Red	231	74	74	2	R
GA76- 2	280	84	81	2	O
GA81-10	260	89	80	2+	ov
GA01-14	267	85	80	2+	ov-O
GA76- 8	283	85	89	4	L
GA76- 1	312	86	87	3+	LO-L
GA76- 1 Rus	155	62	70	3	L
GA76- 4 Rus	196	76	88	2	O-L
GA76-12	272	81	80	3	O
GA76-18	292	90	75	2+	O
GA76- 1	366	93	73	3	O
GA76- 5	329	90	81	2+	ov-O
GA76-39	323	92	76	3+	O
GA76-01	191	92	79	3	O
GA76- 3	250	81	74	3	LO-L
GA76-01	267	85	81	2+	R-O
GA76- 3	314	87	79	3	R-O
GA30-25	259	78	83	3	R-O
GA34-12	314	92	80	2+	R-O
GA38- 1	294	87	84	3	O
Orchid	298	83	87	2	R-O
Penelloc	303	91	77	2+	O-L
Superior (check)	333	94	79	2+	O
Mean	282	86	78		
SD (.05)	43		5		

^{1/} .0 deleted

^{2/} 1 = poor to 5 = excellent

^{3/} O = oblong, R = round, L = long

Campbell Table 8. Yield, specific gravity, tuber rating and tuber shape for selections in late maturity trial, Perham, Maine - 1973.

Selection	Yield above 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Tuber ^{3/} Shape
	Cwt./A	%			
CA11-13	301	90	77	3+	R-O
CA11-15	252	97	75	3	O
CA42- 1	275	83	75	3	O
CA60- 2	344	96	80	3+	O
CA60- 5	284	94	84	3	O
CA60-24	323	94	82	3	O-LO
CA90-17	243	79	84	3	O
CA93- 2	316	89	74	2	O
BR7044- 2	225	83	85	3+	O
BR7046- 1	308	94	90	3	O
BR7070- 3	213	81	75	2+	O
BR7072- 5	297	84	79	3	O
BR7091- 1	324	93	73	3	O-LO
BR7103- 2	328	96	87	3	O
BR7105-10	256	86	78	3+	R-O
BR7108- 3	283	89	88	3	O
B6987-184	273	85	95	3	O
CC53-4	302	86	79	4	O
AF30- 5	228	75	85	3+	R-O
AF30-34	266	81	76	3	R-O
A42-10	279	90	83	3	ov-O
Katahdin	249	94	76	3	Ov-O
Kennebec	309	90	82	3	O-LO
R. Burbank	90	33	81	1	L
Mean	274	86	81		
LSD (.05)	42		5		

^{1/} 1.0 deleted

^{2/} 1 = poor to 5 = excellent

^{3/} O = oblong, R = round, L = long

Campbell Table 9. Yield, specific gravity, tuber rating and tuber shape of selections from other breeding programs, Perham, Maine - 1973.

<u>Selection</u>	<u>Yield above 2"</u> <u>Cwt./A</u> <u>%</u>		<u>Specific^{1/}</u> <u>Gravity</u>	<u>Tuber^{2/}</u> <u>Rating</u>	<u>Tuber^{3/}</u> <u>Shape</u>
F6200-8	248	89	71	3	R-O
F6589	219	91	70	3+	O
F6609	265	89	72	3	R-O
F65044	254	94	69	3	O
Nooksack	153	87	68	3	O
Wash. 245-2	233	83	76	2	L
284-1	311	92	73	2+	O-L
284-5	240	92	61	2+	O-L
300-6	191	85	63	1+	L
316-3	78	55	64	3	O
327-3	114	60	67	2	L
330-1	242	83	72	3	O-L
Nampa	-	-	68	2+	L
A64206-4	-	-	68	2	L
ND 993-13 Rus	259	82	75	3+	O
ND7103- 4	199	89	76	3	O
ND7135- 9	260	94	78	3	R-O
ND7196-18	209	67	74	3+	O
ND7710- 5	240	92	71	4	R-O
ND7761-33 Rus	374	96	74	3	O-L
ND7135- 9	260	94	77	3	R-O
ND7878- 1	247	93	71	3+	R-O
ND8297- 1	303	89	70	3+	R-O
ND6435- 5	258	81	69	3	O
ND8506- 1	152	67	73	2	O
Cascade	-	-	67	4	O-L
Katahdin	307	96	68	3	ov-O
Kennebec (check)	338	95	68	3-	LO
R. Burbank	181	55	71	1+	L
Raritan	298	90	89	4	R-O
Hudson ^{4/}	341	95	64	3	R-O
Worchio ^{4/}	322	90	77	2+	R-O
Mean	238	88	71		
LSL (.05)	50		6		

1/ 1.0 deleted

2/ 1 = poor to 5 = excellent

3/ O = oblong, R = round, L = long

4/ Two replicates - not included in analysis

NEW JERSEY

Melvin R. Henninger

Variety Trials

Locations: 1/

1, 3 and 4	Vegetable Research Farm, East Brunswick
1A	Soils and Crops Research Farm, Adelphia
2 and 2A	Johnson Bros. Farm, Deerfield
5	Grunow Bros. Farm, Pomona

Field Plot Design: Randomized block with

Location	1	1A	2	2A	3	4	5
No. of Reps.	3	1	3	1	3	2	4

Plot Size: Three foot rows

<u>Location</u>	<u>Plots Length</u>
1 & 1A	= 24' single row
2 & 2A	= 12' double row
3, 4 & 5	= 15' single row

Seedpiece Spacing: All seedpieces planted at 9" except Norchip was 12".

Soil Test Results: Rutgers Soil Test Lab 2/

<u>Location</u>	<u>pH</u>	<u>P</u> lbs/A	<u>K</u> lbs/A	<u>Mg</u> lbs/A	<u>Ca</u> lbs/A	<u>Texture</u>
1, 3 & 4	5.7	120	192	276	---	loam
1A	5.5	288	159	165	---	sandy loam
2 & 2A	4.5	400+	180	32	160	loam
5	4.9	348	129	30	192	loam sand

1/ Location 1, 1A, 2, 2A, 3, 4, & 5 refer to data in Tables 1, 1A, 2, 2A, 3, 4, & 5, respectively. If not numbered, information applies to all data.

<u>2/ Levels</u>	<u>P</u>	<u>K</u>
Low	0-22	0-66
Med	23-59	67-158
High	over 59	over 158

Fertilizer:

<u>Location</u>	<u>At Planting lbs/A</u>				<u>lbs/A</u>	<u>Irrigation</u>
	<u>N</u>	<u>P2O5</u>	<u>K2O</u>	<u>MgO</u>	<u>Sidedress N</u>	
1, 3 & 4	160	80	80	---	67	Yes
1A	150	120	120	---	---	No
2 & 2A	120	120	60	60	---	Yes
5	126	126	252	---	67	Yes

Dates:

<u>Location</u>	<u>Planted</u>	<u>Stand Count</u>	<u>Harvested Date</u>
1, 3 & 4	April 17	May 18	Aug. 28-31
1A	April 13	May 29	Oct. 1
2 & 2A	April 19	May 30	Aug. 24
5	April 16	May 30	Aug. 6

Specific Gravity: Determine by the air and water method

Sp. Gr. = (Wt. in Air) minus (Wt. in Water) divided into (Wt. in Air)

Air Pollution: A subjective evaluation of foliage injury

1 = no injury, 9 = nearly 100% defoliation or leaf area injured

1 to 4 = good, 5 & 6 = borderline, 7 to 9 = yield may be reduced

Shape: A subjective evaluation of tuber appearance

1 = poor, 5 = excellent

Chip Color: Tubers were stored at 65° F. for two weeks then placed in 50° F. storage until chipping on Dec. 5 & 6. Two or three center longitudinal slices were fried from six to eight tubers in corn oil at 350° F. until bubbling ceased. The potato chips were then classified using the PCII color reference standard varying from one very light to ten very dark with seven and lower considered marketable.

New Jersey Table 1. Tuber Yields and Sizes, Specific Gravity, Stand and Air Pollution, Shape and Chip Color Ratings for 30 White Potato Seedlings and 19 Varieties Grown in Central Jersey, 1973.

Variety	Yield Over 1-7/8" Total	cwt/A	Percentage		Specific Gravity	Stand %	Percentage			Air Poll.	Shape	Chip Color	
			Over 1-7/8"	2-1/2"			Below 1-7/8"	1-7/8" 2-1/2"					
								to 3"	to 3"				
Cascade	345	390	89	31	1.058	97	11	57	30	2	4	2	8
Hudson 9"	327	339	97	71	1.070	97	3	26	43	28	5	2	7
B7621-2	306	311	98	64	1.060	94	2	34	54	10	4	3	6
BR6863-3	306	315	97	58	1.072	98	3	40	44	14	5	3	5
Hudson 6"	297	316	94	59	1.067	98	6	35	43	17	5	3	8
B6987-56	281	310	90	24	1.075	100	9	66	24	0	6	4	6
Kennebec	279	315	88	31	1.061	98	12	57	31	0	4	3	7
CA-46-34	277	285	97	65	1.059	93	3	32	50	15	5	3	8
B6986-2	277	284	97	61	1.055	95	3	36	43	18	5	3	7
Norgold Russet	269	310	87	8	1.059	100	13	79	8	0	4	3	-
BR7085-1	259	274	95	32	1.073	92	5	63	30	2	5	3	7
BR7103-7	255	260	98	47	1.069	96	2	51	40	7	6	4	7
B7252-3	250	292	85	30	1.062	98	15	56	26	4	6	4	7
BR6864-1E	249	287	87	33	1.058	97	13	54	32	1	5	2	-
Raritan	247	266	93	50	1.076	85	7	42	42	8	6	3	7
Keswick	246	257	96	57	1.066	96	4	38	46	11	5	2	7
Superior	243	262	93	15	1.064	99	7	78	14	1	5	2	6
BR6626-5	241	276	88	21	1.066	95	12	67	21	0	4	3	7
Penn71	240	257	94	37	1.066	95	6	56	33	4	5	2	6
B6987-29	238	249	96	38	1.060	98	4	58	36	2	6	2	-
NC64C2-3	237	272	87	23	1.059	97	13	64	23	0	5	3	-
Alamo	236	267	88	22	1.052	96	12	66	20	2	6	3	9
B7196-23	232	250	93	41	1.056	92	7	52	34	7	6	2	8
Chippewa	229	257	89	32	1.059	78	11	57	31	1	5	3	7
BR7108-2	225	233	96	57	1.067	95	4	39	42	14	5	2	-
BR6864-11E	223	255	87	28	1.061	92	13	59	28	0	6	3	-
B7636-4	222	248	89	23	1.064	97	11	66	22	1	5	2	8
B7620-4	219	233	94	28	1.060	89	6	66	28	0	5	3	8
BR6863-8E	218	237	92	32	1.072	94	8	61	32	0	5	2	6
B7633-2	208	234	89	23	1.059	92	11	65	23	0	5	2	7

New Jersey Table 1. (Continued)

Variety	Yield Over 1-7/8" Total	cwt/A	Percentage		Specific Gravity	% Stand	Percentage			Air Poll.	Shape	Chip Color	
			Over 1-7/8" 2-1/2"	Over 3"			Below 1-7/8" 2-1/2"	to 2-1/2"	to 3"				
Sebago	202	220	92	24	1.057	98	8	68	24	0	7	3	6
B7152-1	201	218	92	41	1.062	97	8	51	36	5	5	2	5
B7167-30	199	210	95	41	1.069	92	5	54	28	13	7	3	-
BR7072-5	197	237	83	18	1.062	98	17	65	17	1	5	3	9
BR7108-1	197	220	90	29	1.070	99	10	61	29	0	6	3	-
Norchip	190	221	85	11	1.067	96	15	74	11	0	7	2	6
Wauseon	188	203	92	28	1.054	94	8	64	28	0	7	2	8
Reliance	185	206	90	27	1.058	94	10	63	25	2	7	2	7
B7635-1	184	254	71	6	1.049	99	29	65	6	0	6	2	-
Katahdin	177	186	95	51	1.055	80	5	44	46	5	5	3	7
Abnaki	175	193	90	33	1.059	96	10	56	33	0	5	2	8
B7167-2	175	213	83	13	1.067	99	17	70	13	0	6	3	5
BR6862-2	171	181	95	36	1.062	79	5	59	33	3	6	2	-
B6987-57	166	185	89	29	1.074	100	11	60	29	1	7	3	4
Shurchip	156	188	83	8	1.059	94	17	75	8	0	6	3	6
B6987-54	155	182	84	26	1.058	95	16	58	24	2	7	3	-
CA-46-31	140	146	96	50	1.055	85	4	45	45	5	6	4	-
Bake King	124	162	76	6	1.070	92	24	71	6	0	7	3	-
B6955-36	116	163	71	4	1.073	96	29	67	3	1	6	3	-
Duncan's													
Mod. LSD 5%	56	57	4	12	0.004								
Coef. of													
Variability	16	15	3	24	0.266								

New Jersey Table 2. Tuber Yields and Sizes, Specific Gravity, Stand, Air Pollution, Tuber Shape and Chip Color Ratings for Six White Potato Seedlings and Ten Varieties Grown in Cumberland County, New Jersey 1973.

Variety	Yield Over 1-7/8"	cwt/A Total	Percentage Over 1-7/8"	Specific Gravity	% Stand	Percentage						Air Poll.	Shape	Chip Color
						Below 1-7/8"	to		Over 3"					
							1-7/8"	2-1/2"		3"				
B6503-2	330	363	91	1.073	99	9	42	41	7	2	4	5		
Shurchip	296	352	85	1.068	98	15	54	27	4	4	3	8		
B6987-56	294	339	87	1.078	96	13	54	26	4	6	4	7		
Hudson	278	299	92	1.073	98	8	42	36	15	5	2	7		
Chippewa	258	305	86	1.057	90	14	59	23	3	4	3	7		
Norchip	250	290	86	1.068	100	14	57	27	3	6	2	6		
Monona	237	287	83	1.061	96	17	57	19	7	4	3	6		
Raritan	234	294	79	1.078	86	21	53	25	2	4	2	5		
Kennebec	232	270	83	1.068	96	17	63	20	1	5	3	5		
8AC6	225	255	89	1.064	86	11	47	35	8	4	3	5		
Penn 71	225	249	90	1.066	94	10	53	31	4	5	2	7		
Katahdin	210	240	87	1.054	84	13	44	35	8	5	3	7		
B6987-57	206	232	88	1.073	95	12	55	32	1	7	4	5		
F9-31	194	223	85	1.076	98	15	56	25	6	4	3	5		
Superior	152	183	80	1.061	100	20	67	13	0	5	3	7		
NC64C2-3	151	217	73	1.059	99	27	59	13	1	3	2	7		
Duncan's														
Mod. LSD 5%	87	94	7	0.006										
Coef. of Variability	20	19	5	0.325										

New Jersey Table 3. Tuber Yields and Sizes, Specific Gravity, Stand, and Air Pollution, Shape, and Chip Color Ratings for 46 White Potato Seedlings and Three Varieties Grown in Cumberland County, New Jersey, 1973.

Variety	Yield Over 1-7/8" Total	cwt/A	Percentage		Specific Gravity	% Stand	Percentage			Air Poll.	Shape	Chip Color	
			Over 1-7/8" 2-1/2"	Below 1-7/8" 2-1/2"			1-7/8" 2-1/2"						
							to 3"	Over 3"					
B7152-14	348	384	91	26	1.059	95	9	65	26	1	5	2	-
B7138-11	327	354	92	28	1.079	97	8	64	25	3	6	2	6
B7139-4	320	326	98	66	1.077	98	2	32	50	17	4	2	5
B6987-43	306	317	97	63	1.068	100	3	34	54	9	7	3	5
B7138-8	304	318	96	49	1.080	95	4	46	44	5	4	4	6
B6986-2	304	321	95	57	1.063	93	5	37	36	21	5	3	6
B7138-2	277	295	94	36	1.087	90	6	58	33	3	6	1	6
BR7103-7	266	275	96	58	1.067	97	4	38	51	7	7	4	6
B7190-2	248	260	95	41	1.065	100	4	54	40	1	6	3	6
B7151-4	241	259	93	33	1.067	100	7	60	29	3	5	2	6
Kennebec	235	266	88	31	1.063	92	12	57	28	3	3	2	7
B6969-2	233	247	94	44	1.061	93	6	50	40	4	6	4	4
B7147-100	231	278	83	6	1.073	100	17	77	6	0	5	2	6
B7158-35	226	268	84	9	1.058	92	16	75	9	0	5	2	7
B6987-2	221	237	93	43	1.071	100	7	51	42	1	6	4	5
B7165-18	220	278	79	7	1.074	100	21	72	7	0	5	3	6
B7154-10	218	237	92	28	1.053	100	8	64	26	2	7	2	-
Superior	218	240	91	21	1.063	98	9	70	20	1	5	3	8
B6987-22	217	236	92	24	1.064	100	8	68	19	5	7	3	5
B7148-1	216	227	95	50	1.066	82	5	45	40	10	7	3	5
B7147-15	211	231	91	24	1.083	97	9	68	24	0	4	2	-
B7155-31	206	268	77	6	1.055	95	23	71	6	0	5	3	-
B6951-1	206	230	89	15	1.067	98	10	74	15	0	6	3	6
BR7051-3	205	236	87	35	1.085	92	13	52	32	4	5	3	5
B7155-3	201	214	94	53	1.055	95	6	40	47	7	7	1	6
B7155-56	201	258	78	5	1.057	85	22	73	5	0	8	2	-
B7151-1	197	252	78	10	1.083	85	22	68	9	1	5	2	5
B7148-4	195	207	94	48	1.059	95	6	47	43	4	8	2	-
B7132-25	192	224	86	18	1.084	88	14	68	18	0	6	2	-
BR7089-1	192	202	95	49	1.063	90	5	46	44	5	6	2	-

New Jersey Table 3. (Continued)

Variety	Yield Over 1-7/8"	cwt/A Total	Percentage		Specific Gravity	% Stand	Percentage				Air Poll.	Shape	Chip Color
			Over 1-7/8"	A			Below 1-7/8"	to 2-1/2"	to 3"	Over 3"			
B7165-8	190	218	87	13	1.069	100	13	74	13	0	6	3	-
B7149-6	188	247	76	8	1.058	100	24	68	8	0	4	2	-
B7152-12	188	221	85	16	1.069	92	15	69	16	0	6	3	6
B7160-4	186	229	81	8	1.067	97	19	73	8	0	4	3	6
B7134-3	171	209	82	7	1.067	97	18	74	7	0	7	2	-
B6955-33	171	235	73	5	1.073	97	27	68	5	0	5	3	-
B7147-36	171	237	72	7	1.073	100	28	64	7	0	6	1	5
B7153-29	153	211	72	2	1.062	92	28	70	2	0	7	2	4
B7147-90	143	178	81	4	1.071	98	19	76	4	0	7	1	-
BR7106-5	143	165	87	4	1.071	95	13	83	4	0	5	4	-
B7154-6	133	171	77	3	1.063	90	23	74	3	0	8	2	6
B7196-7	129	160	81	2	1.068	87	19	79	2	0	6	2	-
B7160-1	122	163	74	14	1.066	85	26	60	13	1	5	2	-
B6955-25	119	162	74	8	1.050	97	26	66	8	0	6	2	-
Katahdin	118	135	88	42	1.059	75	12	46	40	1	5	3	5
B7147-81	116	167	69	3	1.081	98	30	67	3	0	7	3	-
B7147-9	110	155	71	10	1.073	87	29	61	10	0	5	1	-
B7152-3	106	142	75	5	1.062	92	25	70	5	0	6	3	-
B7147-19	39	76	51	4	1.055	83	49	47	4	0	8	2	-
Duncan's													
Mod. LSD 5%	32	35	6	10	0.007								
Coef. of													
Variability	11	10	5	29	0.412								

New Jersey Table 4

Tuber Yields and Sizes, Specific Gravity, Stand, Air Pollution and Tuber Shape Ratings, and Chip Color for 38 White Potato Seedlings and Two Varieties Grown in New Brunswick, New Jersey 1973.

Variety	Yield Over 1-7/8"	cwt/A Total	Percentage		Specific Gravity	% Stand	Percentage					Air Poll.	Shape	Chip Color
			Over 1-7/8"	2-1/2"			Below 1-7/8"	1-7/8" 2-1/2"			Over 3"			
								to 2-1/2"	to 3"	to 3"				
B7629-1	265	273	97	45	1.049	98	3	52	25	20	7	2	8	
B7694-1	261	285	92	15	1.078	100	8	77	14	1	5	3	8	
B7802-2	241	248	97	33	1.063	98	3	64	28	5	7	2	6	
B7635-2	229	243	94	44	1.042	95	6	50	41	3	5	1	-	
B7786-3	210	236	89	18	1.068	100	11	71	18	0	5	3	6	
B7631-5	208	215	96	34	1.059	100	4	62	34	0	3	2	-	
B7676-2	201	236	85	14	1.067	98	15	71	14	0	6	3	5	
B7602-1	197	210	94	19	1.081	95	6	75	19	0	4	3	6	
B7678-12	197	216	91	27	1.072	100	9	64	25	2	4	1	-	
B7768-4	197	228	86	28	1.051	90	14	58	27	2	4	3	-	
Superior	195	215	89	13	1.070	95	11	76	7	6	5	3	7	
B7572-4	194	203	95	55	1.074	93	5	40	41	14	5	4	7	
B7680-3	191	240	79	9	1.051	95	21	70	9	0	8	1	-	
B7683-6	186	208	90	39	1.056	95	10	51	35	5	5	1	-	
B7631-8	181	198	92	35	1.072	100	8	57	35	0	4	1	-	
B7708-2	179	193	93	18	1.074	90	7	75	18	0	6	2	-	
B7617-1	178	188	94	36	1.053	80	5	58	35	2	6	3	5	
B7707-5	177	214	83	12	1.063	100	17	71	12	0	6	3	-	
B7805-1	176	190	93	45	1.066	95	7	47	41	5	6	2	8	
B7807-2	174	195	89	25	1.079	93	11	64	25	0	5	3	7	
B7678-13	163	178	92	21	1.055	93	8	70	21	0	7	2	-	
B7684-7	162	205	79	11	1.065	90	21	68	11	0	5	1	-	
B7669-2	161	204	79	14	1.051	73	21	64	14	0	5	1	-	
Katahdin	160	176	91	25	1.042	95	9	66	21	4	4	2	7	
B7755-1	158	180	87	20	1.066	93	13	67	20	0	5	2	-	
B7602-2	154	163	94	31	1.084	98	6	63	29	2	5	2	-	
B7147-8	150	198	76	3	1.076	88	24	73	3	0	5	3	-	
B7744-4	146	166	87	23	1.053	100	13	64	23	0	7	3	8	
B7684-4	144	180	80	22	1.043	93	20	58	20	2	4	1	-	
B7767-1	138	182	76	4	1.051	95	24	71	2	2	7	2	-	

New Jersey Table 4. (Continued)

Variety	Yield Over 1-7/8"	cwt/A Total	Percentage		Specific Gravity	% Stand	Percentage					Air Poll.	Shape	Chip Color
			Over 1-7/8"	2-1/2"			Below 1-7/8"	to 2-1/2"	to 3"	Over 3"				
B7684-1	137	179	76	2	1.063	98	24	74	2	0	8	1	-	
B7711-2	135	159	85	23	1.059	95	15	62	19	4	7	1	-	
B7678-2	131	199	66	1	1.064	100	34	65	1	0	4	2	-	
B7587-5	124	144	87	6	1.064	100	13	81	6	0	7	3	7	
B7654-1	113	143	79	8	1.069	98	21	71	8	0	6	3	-	
B7649-5	86	114	75	9	1.054	93	25	66	9	0	8	2	-	
B7698-1	74	90	82	22	1.041	75	18	60	22	0	4	2	-	
B7678-6	73	145	50	0	1.069	93	50	50	0	0	4	1	-	
B7766-2	29	34	86	23	1.080	90	14	63	23	0	5	2	-	
B7743-4	25	76	33	0	1.068	98	67	33	0	0	8	2	-	
Duncan's														
Mod. LSD 5%	62	62	9	19	0.008									
Coef. of														
Variability	19	17	5	46	0.392									

New Jersey Table 5. Tuber Yields and Sizes, Specific Gravity, Stand and Air Pollution Ratings for Two White Potato Seedlings and Ten Varieties Grown in Atlantic County, New Jersey 1973.

Variety	Yield		Total	Percentage		Specific Gravity	% Stand	Percentage			Air Poll.
	Over 1-7/8"	cwt/A		Over 1-7/8"	2-1/2"			Below 1-7/8"	to 2-1/2"	to 3"	
Hudson	202	224	224	90	38	1.079	93	10	52	37	3
Cascade	188	225	225	84	6	1.073	91	16	78	6	3
Penn 71	185	209	209	86	16	1.074	96	14	70	16	6
Kennebec	184	212	212	86	14	1.074	89	14	71	14	4
Superior	143	172	172	82	6	1.068	93	18	76	6	4
Raritan	143	168	168	86	14	1.084	89	14	72	14	4
Norchip	137	167	167	80	12	1.074	100	20	69	12	7
Shurchip	128	158	158	80	4	1.068	98	20	76	4	3
B6987-29	126	150	150	83	9	1.075	98	17	74	9	5
Chippewa	116	150	150	77	11	1.069	89	23	66	11	6
Katahdin	101	132	132	76	8	1.067	74	24	68	8	6
B6955-35	73	113	113	64	4	1.075	96	36	61	4	5
Duncan's											
Mod. LSD 5%	56	57		9	9	0.003					
Coef. of											
Variability	27	22		7	53	0.221					

NEW YORK

B. B. Brodie

Field Performance of Potato Breeding Lines in
Golden Nematode Infested Soil

Eighteen breeding lines of potato were evaluated for yield, specific gravity, grade, and nematode resistance in golden nematode infested soil at the Nematode Research Farm in Steuben County, New York. The nematode population density was approximately 300 cysts/150 ml of soil. Each line was planted in a 10-hill plot replicated three times with 12-inch spacing between plots. One hill of each plot was sacrificed for golden nematode evaluations. Golden nematode evaluations were made by determining the number of immature females per gram of root. Yields were taken from the remaining 9-hills of each plot. The lines were planted June 21, 1973 and harvested October 5, 1973.

The 1973 growing season was characterized by below normal rainfall and above average temperature. A severe moisture stress was evident during tuberization.

Each of the 18 lines were evaluated for root-knot resistance in greenhouse tests. Each line was replicated three times and planted in soil equally infested with Meloidogyne incognita, M. arenaria, M. javanica, M. hapla, and M. incognita acrita. After three weeks the roots were indexed on a 0-10 scale with 0=no galls and 10=maximum galling.

In the 1973 trial, yield of all plots were extremely low. The plants were under severe moisture stress during tuberization which caused a greater yield of No. 2 potatoes. Observations indicated that late maturing lines yielded better than early maturing lines. Four of the breeding lines (B6987-56, B7613-1, B7617-1, B6987-25) yielded better than Katahdin. Highest yields were obtained from B6987-56 and B7613-1. Specific gravity of all the breeding lines compared favorably with Katahdin. Golden nematode resistance was confirmed in all lines except B7154-10, B7589-5, B7635-2, B6987-25, and B6987-43. Good root-knot nematode resistance was found in lines B7152-3 and B7611-5.

New York Table 1. Yield, specific gravity, and golden nematode evaluation of potato breeding lines planted in golden nematode infested soil

Breeding line or variety	Yield (cwt/A)		Specific gravity	Cysts/g of root	Root knot Index
	No. 1	No. 2			
B6987-56	119	20	1.083	0.0	5.0
B7155-3	72	33	1.071	0.0	5.0
B7152-3	13	21	—	0.0	1.5
B7152-12	37	34	1.072	0.0	5.0
B7154-6	66	44	1.064	0.0	4.3
B7154-8	36	29	1.071	0.0	3.6
B7154-10	37	49	1.066	0.38	3.0
B7155-51	58	24	1.067	0.0	8.0
B7155-56	44	40	1.069	0.0	3.6
B7589-5	18	19	—	0.15	3.3
B7611-5	20	35	1.077	0.0	2.0
B7613-1	104	19	1.068	0.0	3.5
B7617-1	92	24	1.067	0.0	3.5
B7633-2	69	37	1.072	0.0	4.3
B7635-2	47	18	1.066	2.40	10.0
B7635-4	17	39	1.068	0.0	6.3
B6987-25	91	22	1.077	0.36	4.5
B6987-43	56	7	1.076	0.43	6.0
Wauseon	90	18	1.066	0.0	8.0
Katahdin	77	30	1.068	7.4	4.0

NEW YORK (LONG ISLAND)

R. C. Cetas

Evaluation of Potato Cultivars and Breeding Lines for Scab and
Verticillium Wilt Resistance on Long Island in 1973

Scab. Sixty cultivars and breeding lines were evaluated for scab resistance in soils that were naturally infested with Streptomyces scabies at the Long Island Vegetable Research Farm, Riverhead, New York in 1973. The pH of the soil was 5.4 when determined in 0.01N CaCl_2 and varied from 5.5 to 5.8 when determined in water on October 5, 1973. The seedpieces were cut and treated with 8% active Dithane M-45 dust on April 5, and were planted by hand in 10-hill plots on April 16. Each plot was paired with one of the Chippewa cultivar, which was planted by machine. The hand planted seedpieces were spaced 12 inches apart in the row and the machine planted ones nine inches apart. All rows were 34 inches apart. The 8-16-8 grade fertilizer was applied at the rate of 2250 pounds per acre as the rows were marked with the two-row potato planter. Sprays were applied as needed for the control of foliar diseases and insects. The plants were rotocut on September 4 and the tubers were harvested on September 18.

Forty tubers, or all tubers if less than 40 were available, from each plot were washed and examined for scab lesions. Each tuber was scored 0 (no lesions) to 4 (deep pits) for type of scab present, and 0 (no lesions) to 5 (61% or more) for surface area covered by scab lesions. These values were converted to individual tuber indices that ranged from 0 (no scab) to 140 (61% or more of the surface area covered by deep pitted scab). The scab index for each plot was calculated by dividing the sum of the individual tuber indices by the number of tubers examined. The index for each cultivar and breeding line in the replicated trial was determined by calculating the average of the two plots. A scab index ratio was calculated for each cultivar and breeding line by dividing the cultivar or breeding line index by the average index of their respectively paired Chippewa plots and multiplying the quotient by 100. The ratios allow one to determine quickly which cultivars and breeding lines were more or less resistant to scab than Chippewa and to compare one cultivar or breeding line with another.

The results of the 1973 test (New York (Long Island) Table 1) suggest that Wauseon, B6987-29, NY-49, and NY-54 were highly resistant to scab. Several other varieties and lines appeared to be more resistant to scab than Katahdin, but most of the lines appeared to be in the Katahdin-Chippewa range of susceptibility.

Verticillium wilt. Fifty-six cultivars and breeding lines were selected for evaluation for resistance to Verticillium wilt in 1973. The seedpieces were cut and treated with 8% Dithane M-45 dust on April 5. On April 16, 29 breeding lines and cultivars were planted by hand in single-row, 20-hill plots that were replicated four times, and 27 cultivars and breeding lines were planted in 20-hill nonreplicated plots. The seedpieces were spaced 12 inches apart in the row and the rows were 34 inches apart. All cultural practices were those employed by the grower-cooperator in whose field these tests were conducted.

Observations on plant growth and vine condition were made periodically during the growing season. On August 14, the condition of the vines in each plot was rated on a scale of 1 to 7 as follows: 1 = plants normal or nearly so, 2 = slight wilting and yellowing of the foliage, 3 = 60 to 90% of the foliage green, 4 = 40 to 60% of the foliage green, 5 = 20 to 40% of the foliage green, 6 = trace to 20% of the foliage green, and 7 = all plants dead. The tubers were harvested on September 26.

The tubers were sized on a grader equipped with 1.5- and 2-inch chains. All tubers that passed over the 1.5- and 2-inch chains were counted, and weighed. All tubers that passed over the 2-inch chain were washed and examined for growth cracks and knobs. Forty tubers (2-inch minimum), or all tubers if less than 40 were available, from each plot were examined for pinkeye, stem-end vascular browning, hollow heart, and internal necrosis (nectoric rust brown flecks and small spots in the flesh). Stem-end vascular browning was scored in a cross-sectional plane 1/8 to 1/4 inch above the stem attachment. A potato hydrometer was used to measure the specific gravity of an 8-pound sample of tubers from each plot.

The stand, vine score, yield, and specific gravity data from the replicated trial were subjected to the analysis of variance. Percentages were transformed to equivalent angles and the transformed data were analyzed. Duncan's multiple range test was used to determine significant differences among means. The small letters in the tables indicate groups of cultivars and breeding lines that do not differ significantly at the 5% level.

Circumstances beyond our control made it necessary to conduct these tests at a new location in 1973. The new site was selected based upon past history provided by the grower-cooperator and the results of fumigation experiments conducted in the field in 1967. Assays of soil and of potato root samples in July 1973 showed that the Sassafras loam soil was infested with the root lesion nematode, Pratylenchus penetrans. Typical Verticillium wilt symptoms, however, failed to develop in known susceptible cultivars, probably because the population of Verticillium dahliae and/or V. albo-atrum was very low in the soil as a result of recent cropping procedures by the grower. Consequently, the results obtained (New York (Long Island) Tables 2 and 3) probably were a measure of the response of the cultivars and breeding lines to the 1973 growing season, rather than a measure of their reaction to the Verticillium wilt-root lesion nematode complex.

This work was conducted in cooperation with Dr. H. D. Thurston and Dr. R. L. Plaisted, Departments of Plant Pathology and Plant Breeding, respectively, Cornell University, Ithaca, New York; Dr. R. E. Webb, United States Department of Agriculture, Agricultural Research Service, Northeastern Region, Agricultural Research Center, Beltsville, Maryland; and Mr. Charles Cichanowicz, Jr., Jamesport, New York.

New York (Long Island) Table 1. Results of growing cultivars and breeding lines of potatoes in soils that were infested with Streptomyces scabies at Riverhead, New York in 1973.

Cultivar or breeding line	Scab index		Type of scab on affected tubers				Percentage of tubers with scab		
	Line	Chipp- ewa	Ratio1/ Ratio2	Majority of lesions		Average lesions			
				Line	Chippewa				
40 tubers examined from each of 2 replications									
Abnaki	6.4	31.2	20.5	2	4	2.2	3.6	89	100
Alamo	4.6	35.8	12.8	2	4	2.0	3.8	74	96
Cascade	6.1	32.2	18.9	2 - 3	4	2.7	3.8	52	91
Cascade M	2.7	33.1	8.2	2	4	2.0	3.6	59	89
Hudson (NY-41)	37.7	27.6	136.6	3 - 4	4	3.2	3.7	98	99
Hudson (NY-41)	20.8	15.0	138.7	3 - 4	4	3.1	3.5	96	79
Katahdin	7.6	19.0	40.0	2 - 3	4	2.7	3.5	78	95
Katahdin	17.7	39.0	45.4	2 - 3	4	2.9	3.8	95	95
Norchip	2.8	29.7	9.8	2 - 3	4	2.6	3.6	38	98
Peconic	6.1	27.0	22.6	2	4	2.4	3.7	82	89
Raritan	23.4	15.0	156.0	4	4	3.4	3.5	95	85
Reliance	2.7	34.6	7.8	2	4	2.1	3.9	62	95
Superior	0.7	16.1	4.3	2	4	2.1	3.6	11	88
Wauseon	0.5	31.7	1.6	2	4	2.1	3.7	19	98
B6603-6	21.7	14.5	149.7	3 - 4	4	3.1	3.4	85	89
B6741-23	2.1	33.4	6.3	2	4	2.1	3.7	46	99
B6879-5	2.2	31.5	7.0	2	4	2.3	3.7	40	94
B6987-29	0.6	31.6	1.9	2	4	2.3	3.7	19	88
NY-48	2.2	32.6	6.7	2	4	1.7	3.7	59	95
NY-49	1.2	43.0	2.8	2	4	2.0	3.7	44	100
NY-53 (F21-14)	27.3	29.9	91.3	3 - 4	4	3.1	3.7	89	94
NY-54 (H413-5)	1.0	27.6	3.6	2	4	2.0	3.7	35	95
NY-55 (J59-10)	54.4	34.2	159.1	4	4	3.8	3.7	99	100
NY-56 (J99-5)	3.1	22.0	14.1	2	4	2.0	3.5	70	89
NY-57 (J370-3)	40.2	22.6	177.9	4	4	3.9	3.6	98	96
F293-10	7.5	45.8	16.4	2 - 4	4	2.8	3.8	80	95
K21-1	27.4	31.5	87.0	2 - 4	4	3.0	3.8	95	90
K37-1	3.2	33.5	9.6	2	4	2.1	3.7	66	91

(New York (Long Island) Table 1 continued on next page)

New York (Long Island) Table 1 (concluded).

Cultivar or breeding line	Scab index		Ratio ^{1/}	Type of scab on affected tubers			Percentage of tubers with scab	
	Chipp- ewa			Majority of lesions		Average lesions		
				Line Chippewa				
	Line	ewa		Line	Chippewa			
M11-41	13.6	24.4	55.7	2 - 3	3 - 4	2.5	3.4	95
M38-2	2.0	13.6	14.7	2 - 3	3 - 4	2.7	3.4	30
M72-3	1.4	31.2	4.5	2	4	2.2	3.9	30
M85-34	1.2	36.8	3.3	2	4	2.0	3.7	40
M85-40	4.6	36.8	12.5	2	4	2.2	3.7	70
Katahdin	15.0	17.3	86.7	2 - 4	4	3.1	3.7	95

^{1/} Ratio = Index for cultivar or breeding line divided by index for paired Chippewa plots multiplied by 100.

New York (Long Island) Table 2. Percent stand, vine score, and yield of cultivars and breeding lines of potatoes grown in soils suspected to be infested with organisms associated with Verticillium wilt in 1973.

Cultivar or breeding line	Percent stand 6/5	Vine score 8/24	Yield per acre			No. of tubers per hill	
			Total cwt	2-inch minimum		Total	2- inch minimum
				Cwt	Percent ^{1/}		
<u>Four replicates, 20 hills, 12-inch spacing</u>							
Abnaki	98 cde	5.2 def	314 f-i	300 i-l	75 d-g	7.6 d-g	5.7 jk
Abnaki	99 de	5.8 e-h	327 ghi	286 h-l	72 c-g	7.2 c-g	5.1 f-k
Alamo	91 b	6.5 gh	223 b	171 ab	55 a	5.9 bc	3.3 ab
Cascade	99 de	5.0 c-f	423 j	347 l	67 a-f	9.4 hi	5.8 jk
Cascade M	79 a	3.0 a	296 c-i	246 d-j	60 a-d	7.8 efg	4.7 d-j
Hudson (NY-41)	96 b-e	5.5 efg	326 ghi	305 i-l	81 fg	6.3 b-e	5.1 f-k
Katahdin	100 e	6.0 e-h	311 e-i	280 g-l	75 d-g	6.6 c-f	4.9 d-k
Kennebec	99 de	5.2 def	317 f-i	272 f-l	70 b-g	6.2 bcd	4.3 b-h
Kennebec	99 de	5.8 e-h	280 b-h	232 b-i	64 a-e	6.0 bc	3.8 a-d
Kennebec	96 b-e	5.5 efg	304 d-i	261 e-j	68 a-g	6.2 bcd	4.3 b-h

(New York (Long Island) Table 2 continued on next page)

New York (Long Island) Table 2 (continued).

Cultivar or breeding line	Percent stand 6/5	Vine score 8/24	Yield per acre		No. of tubers per hill	
			Total cwt	2-inch minimum Percent ^{1/} Cwt	Total	2- inch minimum
Norchip	100 e	6.2 fgh	338 hi	262 e-k	9.8 i	6.0 k
Peconic	100 e	6.5 gh	286 b-i	232 b-i	8.0 fgh	5.2 g-k
Raritan	95 b-e	4.8 cde	243 b-f	208 b-f	5.8 abc	3.9 a-e
Reliance	98 cde	7.0 h	269 b-h	234 b-i	6.0 bc	4.0 b-f
Superior	96 b-e	7.0 h	256 b-g	225 b-h	5.8 abc	4.2 b-g
Wauseon	94 bcd	6.8 h	155 a	120 a	4.6 a	2.9 a
NY-54 (H413-5)	98 cde	6.0 e-h	306 d-i	251 d-j	8.2 gh	5.4 h-k
NY-55 (J59-10)	100 e	6.5 gh	331 ghi	311 jkl	6.3 b-e	5.2 g-k
NY-57 (J370-3)	99 de	3.2 ab	340 hi	310 jkl	7.2 c-g	5.4 h-k
K21-1	96 b-e	7.0 h	270 b-h	216 b-h	8.1 fgh	5.0 e-k
K56-2	94 bcd	5.2 def	249 b-f	188 bcd	8.0 fgh	4.6 c-j
K56-7	96 b-e	6.5 gh	284 b-h	247 d-j	7.0 c-g	4.8 d-k
K59-7	94 bcd	4.0 abc	234 bcd	174 abc	7.6 d-g	4.2 b-g
K60-30	95 b-e	6.0 e-h	268 b-h	210 b-g	8.2 g-h	5.0 e-k
K292-6	96 b-e	5.8 e-h	308 e-i	264 e-k	7.1 c-g	5.0 e-k
K297-3	92 bc	5.5 efg	231 bc	195 b-e	6.4 cde	4.3 b-h
K313-10	99 de	6.0 e-h	315 f-i	276 f-k	7.7 d-g	5.6 ijk
K349-7	100 e	5.5 efg	273 b-h	238 c-j	6.2 bcd	4.4 c-i
K357-16	99 de	4.8 cde	296 c-i	269 f-k	6.2 bcd	4.8 d-k
K527-9	98 cde	7.0 h	313 f-i	273 f-l	7.5 d-g	5.5 ijk
K565-16	99 de	4.2 bcd	364 ij	337 kl	7.0 c-g	5.7 jk
6HS-9	99 de	6.5 gh	238 be	206 b-f	5.0 ab	3.6 abc
Nonreplicated, 20 hills, 12-inch spacing						
Kennebec	100	5	400	357	6.5	4.6
B6741-23	90	5	281	211	7.3	4.2
B6879-5	95	5	346	288	9.5	6.2
B6969-9	100	6	315	261	7.2	4.9
B6987-29	100	6	388	361	7.0	5.6
B7138-11	100	3	315	234	8.9	4.6

(New York (Long Island) Table 2 continued on next page)

New York (Long Island) Table 2 (concluded).

Cultivar or breeding line	Percent stand 6/5	Vine score 8/24	Yield per acre		No. of tubers per hill	
			Total cwt	2-inch minimum Cwt Percent ^{1/}	Total	2-inch minimum
B7139-4	95	3	480	442 78	8.3	6.5
B7139-6	100	6	208	138 51	6.0	3.0
B7151-4	100	3	354	281 57	9.0	5.2
NY-47	90	3	404	331 62	11.4	7.1
NY-53 (F21-14)	100	6	311	273 75	7.3	5.5
NY-56 (J99-5)	100	4	338	300 73	7.6	5.6
F293-10	95	6	215	192 75	5.4	4.0
J249-17	100	5	304	261 70	7.4	5.2
K37-1	100	6	381	284 57	10.9	6.2
L33-6	100	6	196	169 68	4.9	3.4
Kennebec	100	5	415	357 70	8.4	5.6
L36-26	75	6	292	234 64	11.1	7.1
L39-9	100	4	338	281 64	8.2	5.3
L66-14	100	7	219	158 51	6.8	3.5
L176-23	100	3	377	284 58	11.0	6.4
L241-3	100	7	227	158 54	7.0	3.8
L298-12	95	6	427	365 69	11.0	7.6
L521-5	95	4	388	331 67	9.1	6.1
L521-7	95	3	323	281 67	7.5	5.0
L529-20	100	4	258	196 56	7.2	4.0
L551-7	100	6	365	334 80	7.7	6.2
L554-8	95	6	307	265 70	7.2	5.1

^{1/} Based on number of tubers.

New York (Long Island) Table 3. Specific gravity and percentage of tubers with various defects when cultivars and breeding lines were grown in soils suspected to be infested with organisms associated with Verticillium wilt in 1973.

Cultivar or breeding line	Specific gravity ₁ /	Pinkeye ₂ /	Stem-end browning ₂ /	Internal necrosis ₂ /	Hollow heart ₂ /	Growth cracks ₃ /	Knobs ₃ /
Four replications, 20 hills, 12-inch spacing							
Abnaki	682 h-k	0.0	12	0.6	11.9	1.6	38.8
Abnaki	642 e-h	0.0	11	0.0	7.5	2.0	35.1
Alamo	545 a	1.3	28	0.0	0.0	22.0	18.0
Cascade	680 h-k	1.2	25	0.0	1.9	4.6	18.0
Cascade M	748 l	3.8	61	1.2	1.2	1.7	29.3
Hudson (NY-41)	710 jkl	0.6	28	0.6	3.8	5.9	2.0
Katahdin	608 cde	0.0	39	3.1	1.2	2.3	0.5
Kennebec	670 g-j	9.4	29	1.2	1.2	2.9	15.5
Kennebec	678 g-j	7.5	34	0.0	1.9	3.0	19.3
Kennebec	662 f-i	8.1	34	0.6	1.9	4.5	10.0
Norchip	745 l	0.0	21	4.4	0.0	4.5	1.2
Peconic	728 kl	0.0	16	2.5	0.0	1.4	0.2
Raritan	760 l	2.5	49	1.9	30.6	1.7	20.1
Reliance	595 bcd	0.0	62	0.0	1.9	12.9	11.7
Superior	648 e-h	4.4	32	0.6	0.0	4.0	4.0
Wauseon	557 ab	0.0	26	0.0	0.7	0.5	6.6
NY-54 (H413-5)	648 e-h	0.6	11	16.2	0.0	4.3	1.0
NY-55 (J59-10)	548 a	0.0	7	0.6	0.0	1.4	4.1
NY-57 (J370-3)	682 h-k	0.0	44	0.0	1.2	0.2	4.2
K21-1	660 f-i	0.6	12	0.0	0.6	0.0	0.2
K56-2	725 jkl	0.6	29	5.0	0.6	1.7	1.2
K56-7	665 f-j	1.9	38	1.2	0.0	0.5	2.4
K59-7	582 abc	0.6	34	7.5	0.0	0.3	3.1
K60-30	755 l	0.0	22	1.9	0.0	1.0	1.6
K292-6	755 l	3.1	65	42.5	0.0	3.1	3.1
K297-3	685 h-k	0.6	4	0.6	7.0	1.6	0.0
K313-10	712 jkl	0.0	6	2.5	0.6	0.0	0.2
K349-7	630 d-g	0.0	31	6.2	3.1	2.2	2.0
K357-16	665 f-j	0.0	20	0.0	3.8	1.9	1.9
K527-9	650 e-i	1.2	28	0.0	0.0	2.6	2.6

(New York (Long Island) Table 3 continued on next page)

New York (Long Island) Table 3 (concluded).

Cultivar or breeding line	Specific gravity ¹ /	Pinkeye ² /	Stem-end browning ² /	Internal necrosis ² /	Hollow heart ² /	Growth cracks ³ /	Knobs ³ /
K565-16	695 ijk	0.6	31	1.9	0.0	1.3	10.0
6HS-9	618 c-f	2.0	35	0.0	13.1	1.8	0.4
<u>Nonreplicated, 20 hills, 12-inch spacing</u>							
Kennebec	68	12.5	42	2.5	10.0	3.3	8.7
B6741-23	68	0.0	25	0.0	0.0	1.3	5.3
B6879-5	72	0.0	18	5.0	2.5	0.8	0.8
B6969-9	68	0.0	2	0.0	0.0	0.0	0.0
B6987-29	73	2.5	32	0.0	0.0	0.9	2.7
B7138-11	83	0.0	8	0.0	7.5	0.0	20.6
B7139-4	83	0.0	30	5.0	2.5	0.0	0.0
B7139-6	79	0.0	28	2.5	45.0	3.3	1.6
B7151-4	79	0.0	40	2.5	32.5	4.8	13.6
NY-47	70	0.0	75	17.5	0.0	0.0	10.9
NY-53 (F21-14)	72	0.0	8	2.5	0.0	0.0	0.0
NY-56 (J99-5)	76	0.0	10	0.0	5.0	0.0	0.0
F293-10	60	0.0	8	0.0	0.0	7.8	0.0
J249-17	65	0.0	5	0.0	2.5	0.0	1.9
K37-1	67	0.0	15	0.0	0.0	13.6	0.0
L33-6	67	0.0	15	0.0	2.5	3.0	4.5
Kennebec	72	15.0	38	0.0	7.5	2.6	6.2
L36-26	66	0.0	32	0.0	0.0	3.7	5.6
L39-9	76	0.0	40	2.5	2.5	2.8	0.0
L66-14	56	0.0	35	5.0	2.5	2.8	31.4
L176-23	83	0.0	70	35.0	5.0	0.0	17.2
L241-3	79	0.0	8	10.0	2.5	0.0	0.0
L298-12	63	0.0	5	0.0	0.0	0.0	9.0
L521-5	75	0.0	25	0.0	0.0	0.0	0.9
L521-7	73	0.0	92	77.5	0.0	0.0	5.2
L529-20	86	0.0	48	12.5	0.0	0.0	0.0
L551-7	89	2.5	0	5.0	0.0	2.4	0.0
L554-8	85	0.0	0	0.0	0.0	0.0	0.0

1/ 1.0 omitted from all specific gravity readings.

2/ Based on 40 tubers per plot.

3/ Based on all tubers, that passed over a 2-inch grader chain, from each plot.

NEW YORK

R.L. Plaisted & H.D. Thurston^{1/}

The New York breeding program in 1973 was concerned with (1) the regular selection and seed multiplication program, (2) the selection and evaluation of two andigena populations, and (3) the evaluation of heterosis in crosses between andigena clones or Chilean tuberosum clones and New York tuberosum clones. The planting was delayed a little in the spring due to wet weather, but the major weather factor affecting yields occurred in August. That month had an average daily temperature three degrees above the long term mean and the rainfall was 2.5 inches less than the mean. In general, tuber number appeared to be reduced more than tuber size and specific gravity is higher than usual. Also, the andigena populations suffered more than the tuberosum, but this could have been confounded with the locations where they were grown.

The crosses of tuberosum clones involved clones selected for chipping ability, resistance to the golden nematode, to Verticillium wilt, and to scab. Some hybrids with selected andigena clones were also made. About 45,000 seedlings of the same kinds of crosses were planted in the greenhouses. Approximately 6000 seedling hills of tuberosum and tuberosum x andigena progenies yielded 822 selections. Last year's seedling hills were indexed for PSTV and from 850 virus-free clones, 111 were saved. Fifty-five of these were hybrids with andigena. The first stage yield trial included 183 clones in addition to Katahdin entered seven times. The preliminary evaluation has reduced these to the 55 described in Table 1. Further elimination will be made before planting based on cooking and chipping data. The second stage yield trial included eleven clones in addition to Katahdin and Hudson. The four which have been saved are described in Table 2. Since we had only five clones in advanced stages of selection, these were included with the 13 clones in the third stage of yield trials. The results of all of these clones are presented in Table 3.

In the spring of 1973, bulk pollinations were made of 450 clones selected from the 5th cycle of andigena population. During the remainder of the year, these same clones were evaluated for chip color, dormancy, and resistance to late blight, PVX, PVY, root-knot nematodes, Colorado potato beetle, aphids, leaf hoppers, and tarnished plant bugs. Thirty-two of the most attractive clones were crossed to tuberosum clones. A subset of the 450 clones with good blight resistance was crossed to clones from Wisconsin with resistance to brown rot. A population of 24,000 andigena clones from 807 accessions were grown as spaced plants. These had been selected once for adaptation, but still over 50% failed to produce any tubers in a 4-month growing season. In spite of an effort to make selections in every accession, the 1615 selections came from 539 of the 807 accessions. This research is coordinated with the International Potato Center.

A yield trial of spaced plants of progenies of crosses among selected andigena clones, among tuberosum breeding lines, and between clones of the two groups was grown at Ithaca, N.Y., Huancayo, Peru, Toluca, Mexico, and Tibaitata, Colombia. Data are being summarized for a thesis, but the exciting aspect was the heterosis of the hybrids over the adapted population. The use of these hybrids in an efficient breeding program for this region is dependent upon some further selection of the andigena, particularly for tuber type. However, they show great promise for heterosis for yield as well as valuable pest resistance. A similar yield trial to measure heterosis in crosses between N.A. tuberosum clones and Chilean tuberosum clones was conducted.

^{1/}In cooperation with Anderson, Brodie, Cetas, Dallyn, Ewing, Fricke, Harrison, Jones, and Siczka

New York (Breeding Program) Table 1. Selected clones from the first stage yield trial -- 1973.

Clone	Yield in cwt/A			Hollow ^{1/} heart (x 1/16)	Internal ^{2/} necrosis (x 1/16)	Specific ^{3/} Gravity	Appear ^{4/} ance	1972			8/ VW
	Total	>1-7/8	>2-1/4					GN ^{5/} +	ACD ^{6/} 0 ² 1 ²	50° ^{7/} Chip A-I	
Katahdin	317	302	273	0	0	1.085	3.2	+	0 ² 1 ²	A-I	5
M2-18	337	317	282	0	0	1.092	2.8	-*	0 ² 1 ²	U	4
-21	335	313	264	0	0	1.078	2.5	-*	0 ⁴	U	6
11-11	350	314	227	0	0	1.092	2.2	-	1 ⁴	A	6
-22	349	304	198	0	0	1.087	2.8	-	1 ⁴	A	6
-40	343	299	214	0	0	1.092	3.0	-	1 ¹ 3	A	4
-41	335	297	225	0	0	1.088	4.0	-	0 ⁴	A	4
-52	346	294	201	0	0	1.091	3.5	-	0 ² 1 ²	A	4
38-1	365	336	300	0	0	1.095	2.3	+	0 ² 1 ²	A	5
81-10	385	338	281	0	0	1.095	2.5	-	0 ³ 1 ¹	A	4
99-7	373	345	294	0	0	1.085	3.3	-	0 ⁴	A	5
-9	325	303	259	0	0	1.083	2.8	-	0 ⁴	A	5
119-4	310	294	269	1	0	1.088	3.5	-	1	A	6
123-21	315	287	228	0	1	1.073	3.5	-	0 ⁴	A	6
138-2	369	351	318	0	0	1.070	3.8	-	0 ³ 1 ¹	I	5
146-3	282	265	238	0	0	1.082	3.0	-	0 ¹ 1 ³	A	5
154-27	350	317	267	0	0	1.070	4.3	-	0 ² 1 ²	A	7
177-13	362	342	305	1	0	1.095	2.8	-	0 ⁴	I	6
-16	380	348	288	0	1	1.094	3.0	-	0 ² 1 ²	I	5
181-17	360	335	288	0	0	1.085	3.3	+	0 ¹ 1 ³	A	5
192-12	396	371	306	0	0	1.092	3.5	-	0 ¹ 1 ³	U	5
195-6	376	348	281	2	0	1.077	4.3	-	0 ⁴	I	7
199-41	323	287	215	0	1	1.089	3.3	-	1 ¹ 3	A	6
-48	313	288	228	0	0	1.095	4.0	-	0 ¹ 1 ³	A	5
200-2	325	309	260	0	1	1.095	3.8	-	0 ² 1 ²	A	5
212-7	347	329	287	0	0	1.085	3.8	-	0 ⁴	A	5
-11	318	303	259	0	0	1.094	3.5	+	0 ² 1 ²	A	5
214-26	374	332	227	1	0	1.077	3.8	-	0 ⁴	A	5
221-23	366	338	270	0	0	1.090	3.0	-	0 ⁴	I	5
222-5	368	330	354	1	0	1.077	4.0	-	0 ⁴	I	4
225-10	356	329	258	0	0	1.087	2.8	-	0 ⁴	I	4
226-7	384	339	370	0	0	1.082	3.0	-	0 ³ 1 ¹	A	5
228-7	290	274	225	0	0	1.097	3.0	-	1 ² 2	A	5
230-2	287	255	166	0	0	1.102	4.0	-	0 ⁴	A	5
233-19	314	238	294	1	1	1.082	3.8	-	0 ³ 1 ¹	A	5
242-10	333	310	266	0	0	1.081	3.5	-	0 ⁴	I	5
-17	350	331	292	0	0	1.071	3.3	-	0 ⁴	A	5
281-15	325	298	261	0	0	1.084	3.3	-	0	I	5

New York Table 1. (Continued)

Clone	Total	> 1-7/8	> 2-1/4	% > 2-1/4	Hollow ^{1/} heart (x 1/16)	Internal ^{2/} necrosis (x 1/16)	Specific ^{3/} Gravity	Appear ^{4/} ance	1972			
									GN ^{5/}	ACD ^{6/}	50° ^{7/} Chip	VW ^{8/}
M281-26	331	308	259	78	0	0	1.103	4.0	-	1 ⁴	A	
297-1	339	298	220	65	1	0	1.082	4.0	-	0 ⁴	A	
-17	309	268	197	64	0	0	1.099	3.8	-		A	
-31	347	323	278	80	0	0	1.105	3.5	-	0 ⁴	A	5
298-10	344	326	291	85	0	0	1.066	4.8	+	0 ⁴	A	
-27	363	337	294	81	1	0	1.094	4.3	-	0 ¹ 3	A	
-29	316	290	233	74	0	0	1.090	3.0	-	0 ⁴	A	
-31	331	310	259	78	0	0	1.075	3.0	-	0 ⁴	A	
299-28	343	318	258	75	0	0	1.080	3.5	-	1 ⁴	A	5
348-19	384	352	284	74	0	0	1.065	3.3	-	0 ⁴	I	6
-22	371	340	300	81	0	0	1.087	2.8	-	0 ⁴	U	
-45	311	286	213	68	0	0	1.074	3.3	-	1 ² 2	A	5
349-9	354	308	212	60	0	0	1.067	3.8	-	0 ¹ 4	U	
-17	347	321	253	73	0	0	1.078	4.0	-	1 ³ 1	A	5
-28	383	356	293	77	0	0	1.082	4.3	-	0 ³ 1	U	
351-1	398	335	223	56	0	0	1.085	3.3	-	1 ¹ 3	A	
-17	385	331	246	64	0	0	1.091	3.3	-	0 ¹ 4	A	
-20	372	340	280	75	0	0	1.089	3.0	-	0	I	

* Sanctae-rosae

New York (Breeding Program) Table 2. Selected clones from second stage yield trial -- 1973

		Yield in cwt/A			% >2-1/4	Hollow ^{1/} ht.	Inter. ^{2/} necr.	Growth cracks	Appear- ^{4/} ance	Specific ^{3/} gravity
		Total	>1-7/8	>2-1/4						
Katahdin	Ith	369	357	324	88	2/16	0	0	3.7	1.083
	Riv	283	278	229	81	t/12	0	0	4.2	
	Cato	348	316	245	70	t/12	0	0	4.0	
Hudson	Ith	460	389	369	80	1/16	0	few	3.2	1.092
	Riv	481	474	437	91	1/12	0	occ	4.5	
	Cato	306	277	217	71	0	0	few	3.5	
L521-5	Ith	452	433	365	81	1/16	0	0	3.2	1.096
	Riv	381	362	265	70	2/12	1/12	0	3.7	
	Cato	441	390	295	67	3/12	0	0	3.7	
L521-7	Ith	433	415	388	90	1/16	0	0	4.2	1.090
	Riv	380	378	350	92	1/12	8/12	0	4.0	
	Cato	455	430	374	82	2/12	2/12	0	4.3	
L529-20	Ith	420	404	380	90	7/16	0	0	2.0	1.098
	Riv	428	410	325	76	0	3/12	0	4.0	
	Cato	374	345	258	69	0	0	0	3.0	
L551-7	Ith	420	395	360	86	2/16	0	few	4.0	1.108+
	Riv	398	396	345	87	5/12	1/12	0	3.7	
	Cato	489	466	405	83	1/12	1/12	few	4.3	

		Vert. ^{8/} wilt	1972 Chip ^{7/}				1971-72	
			40°		50°		ACD ^{6/}	Specific ^{3/} Gravity
GN ^{5/}			2 wk.	6 wk.	2 wk.	6 wk.		
Katahdin	+	4.5	U	U	A-I	A-I	021421	1.080
L521-5	-	3.0	U	U	U	U	07	1.083
L521-7	-	3.0	U	U	U	U	07	1.082
L529-20	-	4.0	U	I	I	A+	0214	1.088
L551-7	-	4.5	I	A+	A	A+	0314	1.101

New York (Breeding Program) Table 3. Third stage yield trial -- 1973.

	Yield in cwt/A									% > 2-1/4			Specific Gravity
	Total			> 1-7/8			> 2-1/4						
	Ith	Riv	Cato	Ith	Riv	Cato	Ith	Riv	Cato	Ith	Riv	Cato	
Katahdin	372	283	348	360	278	316	324	229	245	88	81	70	
Peru 71	427		310	412		278	384		226	90		73	
Hudson	470	481	306	450	474	277	421	437	217	90	91	71	
F21-14	415			399			356			86			
H413-5	376			322			287			76			
J59-10	450	360	362	438	352	335	411	318	261	91	88	72	
J99-5	370			362			336			91			
J370-3	383	327	422	359	316	393	309	272	318	81	83	75	
K21-1	431	325	186	416	315	160	372	242	102	86	74	55	
K37-1	465	280	410	438	252	362	369	137	265	79	49	65	
K56-2	473	373	453	452	356	408	400	263	344	85	71	76	
K56-7	454	339	369	431	328	333	382	258	247	84	76	67	
K59-7	435	364	430	423	342	388	397	237	293	91	65	68	
K60-30	399	238	249	389	235	220	362	172	151	91	72	61	
K292-6	448	377	360	424	367	312	371	297	215	83	79	60	
K297-3	400	329	318	378	309	281	315	195	203	79	59	64	
K313-10	402	287	312	383	278	269	323	200	182	80	70	58	
K349-7	401	359	362	329	328	338	310	302	305	77	84	84	
K357-16	428	392	456	422	384	309	401	349	378	94	89	83	
K527-9	429	339	308	412	335	290	363	268	232	85	79	75	
K565-16	432	359	458	415	344	424	378	250	333	88	70	73	

	Appearance ^{4/}			Hollow ht ^{1/}			Int. necr. ^{2/}			Gr. Cracks			Specific Gravity
	Ith	Riv	Cato	Ith	Riv	Cato	Ith	Riv	Cato	Ith	Riv	Cato	
Katahdin	4.2	4.2	4.0	2.5/24	.2/12	.4/24	0	0	0				1.085
Peru 71	1.3		2.4	0	0	3/24	0	0	0	occ		occ	1.078
Hudson	2.7	4.5	3.5	0	1/12	0	0	0	0		occ	sev, few	1.085
F21-14	3.2			0			0						1.074
H413-5	3.2			0			0			sev			1.077
J59-10	4.0	2.7	3.3	0	0	1/24	0	0	0	occ		occ	1.077
J99-5	3.0			4/12			0						1.093
J370-3	4.5	4.6	3.8	0	0	0	0	0	0	0			1.088
K21-1	4.0	3.5	3.2	2/24	2/16	2/24	0	0	0				1.086
K37-1	4.0	4.0	3.7	1/16	0	0	0	0	0	occ		occ	1.088
K56-2	3.7	4.0	4.0	1/24	0	0	0	1/16	0			occ	1.093
K56-7	3.2	3.5	3.3	0	1/16	0	5/24	0	1/24	occ			1.084
K59-7	4.2	3.5	3.3	1/24	0	0	0	2/16	0			occ	1.080
K60-30	3.8	3.2	3.0	0	0	1/24	0	4/16	0	occ		sev	1.088
K292-6	4.2	4.0	3.7	0	0	1/24	0	2/16	0	occ			1.094
K297-3	4.2	4.0	4.5	1/24	1/16	0	0	1/16	0				1.091
K313-10	3.8	3.2	3.7	1/24	0	0	0	3/16	0				1.078
K349-7	3.3	4.2	4.0	1/24	2/16	0	0	0	0	sev		occ	1.080
K357-16	2.2	4.0	3.3	0	0	3/24	0	0	0				1.089
K527-9	4.2	3.0	2.8	0	0	0	2/24	4/16	0			occ	1.079
K565-16	1.5	2.2	2.3	2/24	1/16	0	0	0	0				1.097

Footnotes for all tables.

- 1/ Hollow heart in four largest tubers in each replication.
- 2/ Internal necrosis.
- 3/ Specific Gravity.
- 4/ Appearance rated from 1 (very rough) to 5 (very nice).
- 5/ Golden-nematode resistance indicated by -.
- 6/ After cooking darkening rated 0 for none, 1 for light gray, and 2 for distinct dark areas.
- 7/ Chip color rated acceptable, intermediate, and unacceptable.
- 8/ Verticillium wilt score from 0 to 7 (susceptible).
- 9/ Growth cracks rated as occasional, few, several, many with superscript to denote the number of times that rating was given.

NEW YORK STATE

Joseph B. Sieczka

Results of Potato Variety Trials in Upstate New York
1972-1973

Four variety trials were conducted by the Vegetable Crops Department in 1973. Two were planted on a well-drained, gravelly mineral soil at the Vegetable Research Farm at Freeville, New York. The other two were grown on muck soil at Canastota and Elba, New York. The two experiments conducted on muck soil were grown in cooperation with Richard Ackerman and Kenneth Stone, Cooperative Extension Agent and Specialist, respectively.

Ten named varieties and five numbered selections were included in Variety Trial I (see Table 1). The entries were spaced at 6, 9, or 12 inches apart within the row depending on what past experience indicated to be optimal. Abnaki produced the highest marketable yield and was second to Kennebec in total yield. Abnaki tubers were round to oblong in shape and attractive in appearance. The major drawback of this variety, hollow heart, showed up again in this experiment with 13 of 30 tubers cut having the disorder. Line J59-10 produced the second highest yield of marketable tubers and the highest mean tuber weight. The tubers of this selection had deep apical eyes and were irregular in shape. Cascade tubers were mostly oblong with a smooth white skin and shallow eyes. The size distribution of oblong varieties such as Cascade, as well as Kennebec, Penn 71, 6RF1, and Russet Burbank, is listed disproportionately in the smaller category ($2-3\frac{1}{4}$ ") because the spool-type sizer used is more accurate separating round-shaped varieties. Hudson did not yield as well as it has in the past. Part of its poor performance in this experiment and the two located on muck soil appears to be related to seed source. Two sources were used in each experiment and one consistently outyielded the other by a considerable amount. Norchip produced the lowest marketable yield.

The highest specific gravities were obtained from Russet Burbank and B6698-19. A great deal of hollow heart (19 of 24 tubers cut) was observed in B6698-19 tubers.

Variety Trial II. Ten russet selections from the USDA Potato Breeding Program were compared to Katahdin in an observational trial at Freeville, New York. Katahdin produced the highest marketable yield but several russet clones showed promise. Line B7147-6 yielded at about the same level as Katahdin but produced the highest specific gravity in the trial. This selection produces long to oblong tubers which have a heavy netted skin. Line B7195-1 tubers also had an attractive netted skin while B7147-10 had a spotty or blotchy net. Large tubers of the latter and B7196-45 had a high percentage of hollow heart. The lowest specific gravity was produced by B7196-73.

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Muck Soils. Three recently released varieties and a promising Pennsylvania selection were grown with Katahdin in two experiments on muck soil. Another entry, Penn 71, was included in the experiment conducted at Elba, New York (see Table 3). Abnaki and Penn 71 yielded the best in the Elba experiment. Abnaki tubers were round to oblong with smooth white skin and attractive appearance.

Penn 71 tubers were oblong and flattened with a smooth bright skin. However, hollow heart again showed up as a possible problem in large Penn 71 tubers. A Pennsylvania selection, 6RF1 yielded about the same as Katahdin. Tubers of the Pennsylvania line are round to oblong, flattened and slightly irregular in shape. Well shaped, attractive tubers were produced by Wauseon at Elba and Canastota, the other site of the muck soil experiments (see Table 4). Some Wauseon tubers at the Canastota location had a vascular discoloration even though vine killers were not used. There were no significant differences in yield in the Canastota experiment. Specific gravity of the entries were about the same in a given experiment. However, the average specific gravity was higher at Elba, possibly due to the earlier planting date.

Storage Results. Samples of three field experiments conducted in 1972 were stored at 50° F from time of harvest until January 1973 when chip color tests and after-cooking darkening ratings were made or until March 1973, when sprouting data were taken. Additional samples from the Variety Trial I and Variety Trial II were stored at 45° F from time of harvest until March 5th when the temperature was raised to 60° F. The samples were chipped on March 30th.

The results listed in Table 5 showed that all the entries in Variety Trial I (1972) produced very light chips when stored at continuous 50° F. Extended storage at 45° F with a two-week reconditioning period still resulted in acceptably light colored chips for most clones. The lightest colored chips were produced by Peconic and the darkest by Wauseon. These two varieties traded positions when rated for after-cooking darkening. Wauseon was free from the disorder, as was Abnaki, while Peconic was the most susceptible of the entries. Sprout growth was least on Russet Burbank and greatest on Norchip.

Line J333-2 produced unacceptably dark chips when stored at 50° F (see Table 6). This clone and BR6626-5 were the only entries in Variety Trial II (1972) which produced dark chips when stored at the 45-60° F regime. All entries were relatively free from after-cooking darkening. Line J333-2 produced the least sprout growth and NC6462-3 the most.

Acknowledgements. Seed for the trials were obtained from the following sources: Hudson and J59-10 from R. L. Plaisted; Penn 71, Monona, 6CX6, and 6RF1 from James Watts, Wise Foods; all other seed obtained from R. E. Webb, USDA.

The cooperation of J. Coulter, A. Vigneri, R. Ackerman, and K. Stone is appreciated.

Upstate New York Table 1. Variety Trial I, Freeville, N.Y. 1973^{1/}

Variety & Spacing	Total Yield cwt/A	cwt/A 2"-4"	% of Total Yield		
			2"-3 ¹ / ₄ "	3 ¹ / ₄ "-4"	4"
Abnaki 6"	650	560	55	31	2
J59-10 9"	611	497	37	44	4
Cascade 6"	593	467	68	11	0
Kennebec 6"	667	460	60	9	0
B6887-16 9"	587	449	53	24	0
Monona 6"	500	429	77	10	0
6RF1 9"	528	425	69	12	0
Hudson 6"	573	401	32	38	7
Penn 71 6"	510	391	62	15	2
B6698-19 9"	557	383	57	12	0
Wauseon 9"	431	361	60	18	1
Katahdin 9"	410	357	54	33	1
6CX6 9"	479	353	59	15	0
Rus. Burbank 12"	468	338	67	6	0
Norchip 12"	445	308	52	17	0
D(.05) Tukey	(149)	(135)			

Variety	Mean Tuber Wt. (oz)	Specific Gravity	Vine ^{2/} Maturity	% of Total Yield		Hollow Heart ^{3/}
				Mis.	Sunburn	
Abnaki	6.4	1.063	7	1	6	13/30
J59-10	7.8	1.063	7	1	9	0/30
Cascade	6.1	1.067	6	1	9	0/30
Kennebec	6.6	1.074	5	9	15	0/30
B6887-16	6.4	1.060	7	2	15	3/30
Monona	5.3	1.061	6	0	3	1/30
6RF1	6.0	1.072	2	4	6	0/30
Hudson	7.5	1.068	3	3	16	0/30 ^{4/}
Penn 71	7.0	1.071	6	3	12	6/30
B6698-19	5.7	1.079	1	12	11	19/24
Wauseon	5.5	1.062	4	1	7	0/30
Katahdin	5.7	1.063	5	0	16	3/26
6CX6	5.3	1.076	2	1	13	0/30
Rus. Burbank	5.3	1.079	5	3	6	6/30
Norchip	5.7	1.077	5	10	11	2/30
D(.05) Tukey	(1.6)	(.007)				

^{1/} Planted May 7, 1973, between row spacing 34", 1500 lbs/A of 10-20-20 applied in bands at planting, killed September 7, 1973, harvested September 28, 1973, 3 replications.

^{2/} Vines rated for maturity on September 5, 1973, 1-9; 9=completely dead, 1=completely green.

^{3/} Numerator=number of tubers with hollow heart, denominator=total number of tubers observed.

^{4/} Reddish-brown discoloration was noted in the center of five of the 30 tubers cut.

Upstate New York Table 2. Variety Trial II, Freeville, N.Y. 1973^{1/}

Variety	Total Yield cwt/A	cwt/A 2"-4"	% of Total Yield		
			2"-3 $\frac{1}{4}$ "	3 $\frac{1}{4}$ "-4"	>4"
Katahdin	593	468	53	26	1
B7147-6	582	454	56	22	0
B7196-1	521	418	67	13	0
B7147-10	661	361	50	5	0
B7196-25	446	343	74	4	0
B7196-45	450	307	61	7	0
B7196-37	489	304	53	9	0
B7196-73	482	286	51	8	0
B7196-20	361	286	65	14	0
B7195-23	468	268	44	14	0
B7188-56	325	70	29	0	0
D(.05) Tukey	242	219			

Variety	Mean Tuber Wt.(oz)	Specific Gravity	Vine ^{2/} Maturity	% of Total Yield		Hollow Heart ^{3/}
				Mis.	Sunburn	
Katahdin	6.6	1.073	6	0	16	2/20
B7147-6	8.2	1.082	6	14	3	3/20
B7196-1	5.1	1.065	4	4	1	0/14
B7147-10	5.0	1.079	5	2	14	7/20
B7196-25	5.2	1.063	8	2	2	0/20
B7196-45	5.5	1.071	5	10	4	7/13
B7196-37	6.2	1.065	7	5	18	0/14
B7196-73	6.5	1.058	7	24	3	0/10
B7196-20	5.7	1.060	7	0	6	1/20
B7195-23	6.4	1.063	6	25	3	0/20
B7188-56	4.0	1.060	3	15	22	0/17
D(.05) Tukey	3.3	.012				

^{1/} Planted May 7, 1973, between row spacing 9", 1500 lbs/A of 10-20-20 applied in bands at planting, killed September 7, 1973, harvested September 28, 1973, 3 replications.

^{2/} Vines rated for maturity on September 5, 1973, 1-9; 9=completely dead, 1=completely green.

^{3/} Numerator=number of tubers with hollow heart, denominator=total number of tubers observed.

Upstate New York Table 3. Variety Trial on Muck Soil, Elba, N.Y. 1973^{1/}

Variety & Spacing	Yield (cwt/A) Total	> 2"	% of Total Yield > 2"	Culls	Specific Gravity	Hollow Heart 2/
Abnaki	429	346	81	4	1.076	3/40
Penn 71	408	345	85	6	1.073	9/40
Katahdin	402	309	77	7	1.074	2/40
6RF1	379	296	78	9	1.074	0/40
Wauseon	368	264	72	10	1.072	2/40
Hudson	332	219	66	14	1.074	0/40
D(.05) Tukey	73	62			ns	

^{1/} Planted May 24, 1973, between row spacing 34", 1500 lbs/A of 5-10-10 prior to planting, harvested October 10, 1973, 4 replications.

^{2/} See footnote 3, Table 1.

Upstate New York Table 4. Variety Trial on Muck Soil, Canastota, N.Y. 1973^{1/}

Variety & Spacing	Yield (cwt/A) Total	> 2"	% of Total Yield > 2"	Culls	Specific Gravity	Hollow Heart 2/
Katahdin	255	210	83	13	1.060	3/40
6RF1	239	201	84	12	1.061	4/40
Abnaki	253	193	76	16	1.062	0/40
Hudson	188	149	79	13	1.062	2/40
Wauseon	188	144	76	9	1.060	3/40
D(.05) Tukey	ns	ns			ns	

^{1/} Planted June 8, 1973, between row spacing 34", harvested October 11, 1973.

^{2/} See footnote 3, Table 1.

Upstate New York Table 5. Variety Trial I, Freeville, N.Y. 1972

Chip Color and Storage Results				
Variety ^{1/}	Chip Color ^{2/}		After-Cooking	Sprout Weight as
	1/8/73	3/30/73	Darkening Rating ^{3/} 1/18/73	% of Total Weight ^{4/} 3/19/73
Hudson (NY41)	67	65	4.9	5
Katahdin	74	64	4.8	7
BR6316-5	71	62	4.3	5
Abnaki	65	54	5.0	6
Kennebec	79	83	4.9	6
Wauseon	64	47	5.0	7
Penn 71	78	79	4.3	4
Peconic	80	84	4.1	3
NY46	70	67	4.7	4
Russet Burbank	77	82	4.9	2
B-5698-8	81	72	4.9	5
Norchip	73	71	4.9	8
D(.05) Tukey	13	14	0.7	2

^{1/} Varieties ranked in descending order of U.S. No. 1 (2 - 4") yields.
(See 1972 report).

^{2/} Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.2 gave readings of 0 and 100 respectively. Higher values indicate lighter chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65. Samples fried on January 8, 1973 were stored at 50°F from time of harvest. Those fried on March 30 were stored at 45°F from time of harvest until March 5 when the temperature was raised to 60°F.

^{3/} Five tubers of each of 4 field replications were peeled and dipped in 0.5% sodium bisulfide; cooked for 7 minutes in an autoclave at 15 p.s.i.; and rated 1-5, where 1 = severe after-cooking darkening, 5 = no darkening.

^{4/} Stored at 50° F.

Upstate New York Table 6. Variety Trial II, Freeville, N.Y. 1972

Chip Color and Storage Results				
Variety ^{1/}	Chip Color ^{2/} Agtron Meter Readings		After-Cooking Darkening ^{3/} 1/17/73	Sprout Wt. as % of Total Wt. ^{4/} 3/19/73
	1/9/73	3/30/73		
BR6626-5	64	52	5.0	6
B6986-2	79	73	4.7	7
J333-2	52	46	5.0	1
NC6462-3	68	75	4.8	15
B6987-25	73	67	4.8	9
Katahdin	69	71	4.9	7
7NS-2	84	81	4.9	8
B6995-24	79	71	4.8	10
D(.05) Tukey	12	17	ns	3

^{1/}See footnote 1, Table 5.

^{2/}See footnote 2, Table 5.

^{3/}See footnote 3, Table 5.

^{4/}See footnote 4, Table 5.

Upstate New York Table 7. Variety Trial with Alaskan Selections,
Freeville, N.Y. 1972

Variety ^{1/}	Sprout Weight as % of Total Weight ^{2/} 3/19/73
AK35	9
Kennebec	6
AK90	3
AF	6
D(.05) Tukey	3

^{1/} See footnote 1, Table 5.

^{2/} See footnote 4, Table 5.

NORTH CAROLINA

F. L. Haynes

Breeding Program

Early maturity, superior chipping quality, resistance to common scab, and adaptation to the Coastal Plain continue to be the primary objectives for new varieties. Since more than 80 percent of the late spring crop is processed, chipping quality has become the most important single attribute other than yield.

Seedling Production and Maintenance. Crosses were made among 11 selected parental clones producing 42 families. Approximately 17,000 single hills were grown in the field from which 431 clones were selected for further trial. All previously selected clones were grown for maintenance and increase at Waynesville in the mountains.

Eastern Trials. Selected clones were tested at three locations in the early commercial area. These included a primary trial of 63 clones at the Tidewater Station and the two advanced trials reported in tables 1 and 2. The trial at Aurora (table 1) was subjected to very severe weather conditions throughout the growing season. Excessively heavy rainfalls (over 12 inches) in the first four weeks followed by a severe drought for eight weeks were responsible for the poor yields at that location.

The clone 64C2-3 continued to produce superior yields and chips. This will be placed in commercial trial next year despite the low specific gravity. Norchip and Penn-71 continued to be the most consistent commercial varieties for both yields and chipping quality. Pungo is always high in yield but is inconsistent in chipping quality.

Adaptation Study

The project of adaptation to the temperate zone of the cultivated Andean diploids S. phureja and S. stenotomum was continued. Two populations were again grown at Fletcher. These were: (1) a segregating population of 9200 seedlings of 57 families, of which 36 were beginning the 4th cycle of selection; and (2) a tuber planting of 2470 clones representing 56 families, of which 40 had completed the 3rd cycle of selection. Tuber size, tuber number, and percentage of segregates tuberizing continued to improve in the selected families. Evaluations of these families were begun for several attributes. Those established to be present included resistance to late blight, immunity to PVY, and very high dry matter. A screening of 60 clones for dry matter produced a mean of 23.5 percent with a range of 18.5 to 31.6 percent. A sub-population for high dry matter is being established.

North Carolina Table 1. Potato performance trial at Aurora. Plots were 2 rows by 20 ft., 4 replications. Planted 3/15/73, harvested 6/26/73 (102 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 2000 lbs/A 8-8-8.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear- ^{2/} ance	Maturity
64C2-3	143	89.8	1.059	2.6	7.2	Med. early
Penn-71	139	93.9	64	2.0	6.7	Med. late
68C5-18	131	83.1	70	3.8	7.0	Mid-season
Pungo	121	86.7	67	4.6	6.7	Mid-season
B7124-N1	119	88.8	60	5.2	7.0	Med. early
B7031-N2	112	85.5	69	2.8	7.0	Med. early
B7127-N22	110	89.2	61	3.8	6.7	Mid-season
58C19-2	110	84.9	68	4.0	7.5	Med. early
B7012-N25	108	89.5	62	4.0	7.5	Med. early
B7127-N2	107	89.8	68	2.8	7.7	Med. early
LaChipper	104	83.5	68	2.4	7.2	Med. early
Norchip	103	80.6	68	2.4	7.0	Med. early
B7012-N18	101	82.8	63	4.0	8.7	Med. early
B7127-N10	99	87.9	68	4.4	8.0	Early
B6973-N4	97	80.4	62	3.8	7.7	Med. early
B6597-N3	94	91.0	69	2.2	8.0	Early
Superior	93	89.5	71	3.0	8.0	Early
B7127-N9	92	85.4	64	4.0	7.7	Med. early
B7033-N4	90	82.9	69	2.8	7.2	Med. early
68C6-1	89	86.2	64	1.6	9.0	Early
B7127-N18	80	81.6	64	3.4	8.5	Early
B7005-N1	77	65.6	61	3.6	8.0	Early
68C5-13	74	73.7	-	-	6.0	Mid-season
B7012-N20	64	70.5	51	4.0	6.7	Mid-season
L.S.D. .05	26	5.0			0.6	
C.V. (PCT)	18	4.2			5.2	

^{1/}Chip color determined by Wise Foods, Borden, Inc., Berwick, Pa. Average of 5 samples, 1 per week for 5 weeks following harvest. 1-4 acceptable with grade 1=perfect; 5 usable but not desirable, 6-14 unacceptable with 14=black.

^{2/}Appearance

1 = Very poor 7 = Good
3 = Poor 9 = Excellent
5 = Fair

North Carolina Table 2. Potato performance trial at Columbia. Plots were 1 row by 30 ft., 33 entries in 4 replications, RCB design with 28 augmented entries. Planted 3/13/73, harvested 6/27/73 (107 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 1300 lbs/A 10-20-20.

Variety	US#1-A cwt/A	Percent US#1-A	Specific Gravity	Chip ^{1/} Color	Appear ^{2/} ance	Maturity
64C2-3	348	95.3	1.057	3.2	7.0	Med. early
B7629-N1	335	97.8	55	6.0	6.0	Med. late
68C5-18	334	95.3	66	4.6	7.0	Mid-season
B6973-N4	330	93.1	55	5.0	8.2	Med. early
LaChipper	328	95.2	60	4.0	6.7	Med. early
58C19-2	327	92.6	59	4.8	7.0	Med. early
B7031-N2	321	95.1	60	5.2	7.7	Early
B7124-N1	320	94.4	55	6.6	7.0	Mid-season
B6959-N1	315	92.8	61	4.0	7.5	Early
Pungo	307	94.4	61	5.0	5.2	Mid-season
B7005-N1	302	89.9	59	4.0	7.7	Early
B7012-N25	300	95.6	54	6.2	7.2	Med. early
Penn-71	295	96.0	60	2.2	6.7	Med. late
Norchip	276	92.8	68	2.4	7.5	Med. early
B7337-N6	273	93.9	51	7.4	7.0	Mid-season
B6597-N3	273	95.6	63	1.8	6.7	Med. early
B7012-N20	271	92.8	61	4.6	6.5	Mid-season
B7012-N18	270	92.6	56	4.8	8.0	Med. early
B7337-N5	267	91.3	63	3.2	7.0	Med. early
B7127-N10	264	95.1	65	4.2	7.7	Early
Superior	262	96.2	67	2.2	8.2	Early
B7008-N4	262	88.7	56	5.6	7.0	Mid-season
B7582-N3	260	95.4	61	2.8	7.0	Mid-season
B7127-N2	251	95.8	61	2.8	7.2	Mid-season
68C5-13	249	90.9	-	-	5.7	Mid-season
B7335-N5	248	80.8	65	5.8	7.0	Early
B7335-N16	247	92.7	52	3.4	6.7	Med. early
B7322-N6	213	93.4	56	6.0	8.2	Early
B7336-N14	200	87.2	62	4.6	7.5	Med. early
B7155-N4	192	90.2	57	3.4	8.5	Early
B7120-N13	174	92.7	58	3.0	7.2	Early
B7340-N7	169	89.5	58	4.6	6.0	Mid-season
B7335-N8	162	91.3	58	3.4	7.0	Early

North Carolina Table 2 continued.

Augmented entries - Rep. 1 - adjusted yields

71C8-15	424	95.6	54	5.0	7.0	Med. early
71C8-11	363	95.8	63	3.2	7.0	Mid-season
71C15-11	363	96.8	75	4.4	7.0	Mid-season
71C15-6	343	94.3	68	3.0	7.0	Med. early
71C8-25	337	91.3			6.0	Mid-season
B7336-N16	319	91.0	56	3.0	8.0	Med. early
B7881-N3	267	90.5			9.0	Early

Augmented entries - Rep. 2 - adjusted yields

71C2-1	412	93.8	49	2.2	6.9	Mid-season
71C15-20	383	93.8	77	2.0	8.0	Mid-season
71C8-19	324	88.2	77	2.8	7.9	Mid-season
B7871-N11	303	81.4			7.0	Mid-season
71C13-1	276	92.7			6.0	Mid-season
71C15-14	244	89.3			7.0	Med. early
B7952-N7	207	79.7			8.0	Med. early

Augmented entries - Rep. 3 - adjusted yields

71C4-5	374	95.5	67	3.2	7.0	Mid-season
B7033-N4	287	90.3	65	3.2	8.0	Med. early
71C8-20	257	94.0			6.0	Mid-season
B7920-N1	252	93.7			7.0	Mid-season
B7871-N7	196	92.4			7.0	Med. early
69C36-1	187	87.6			8.0	Med. early
B7335-N4	117	76.4			7.0	Early

Augmented entries - Rep 4 - adjusted yields

71C8-18	293	96.4	61	2.8	7.0	Med. early
Katahdin	254	95.6	51	5.8	8.0	Late
71C8-1	250	98.8			6.0	Mid-season
B7930-N3	224	97.0	59	6.0	8.0	Med. early
B7853-N1	141	86.7			8.0	Med. early
B7955-N4	132	90.2	59	5.4	8.0	Early
71C15-10	110	95.3			8.0	Early

L.S.D. (.05) Replicated entries (RE), augmented (AE)

RE	45	2.5			.8
AE same rep.	90	5.0			1.6
AE idf rep.	91	5.1			1.6
RE vs AE	72	4.0			1.3
CV (PCT)	11.8	1.9			4.8

1/ and 2/ See footnotes, N. C. Table 1.

NORTH DAKOTA

R. H. Johansen & J. E. Huguelet

In 1973 229 potato crosses were made in the greenhouse from parents having good type, disease and insect resistance, russet or bright red skin color and good processing qualities. Again many crosses were made between parents having long type and russet skin. If the majority of the potatoes consumed seven years from now are in the forms of frozen french fries, crosses must be made with parents having long type, low sugars and possibly russet skin.

Greenhouse and Field Seedlings. Some 40,000 seedlings were grown in the greenhouse during the summer of 1973. These were harvested during November and December and will be planted in the field next spring. Thirty thousand, six hundred fifty seedlings were planted in the field at the Langdon Branch Station, Langdon, North Dakota. From these seedlings, approximately 1,000 clones were saved at harvest for further study and spindle tuber and virus X test. In early spring approximately 6,000 second size seedlings were sent to Dr. Creighton Miller, Lubbock, Texas. Several hundred, which were mostly russet types, were harvested during August and will be replanted next season in North Dakota and Texas. It is hoped that a good russet variety adapted for both states will be found.

Advanced Selections. On May 18 and 19, 618 advanced selections were planted at Grand Forks. From this material 162 were selected and saved at harvest on September 13. A similar number was also planted in a scab test at Fargo and in an index plot at Casselton. In addition a large increase plot of the best selections were planted at Casselton on May 21 and harvested on October 1 and 2. Seed from this material will be used for yield and processing tests.

The USDA at Beltsville, Maryland and the Campbell Soup Company again distributed seed for adaptability tests. Twenty-eight lines were received from the USDA and 33 from Campbell Soup Company.

Promising Selections. Line ND6634-2R and ND7196-18 continue to perform quite good where they are grown. Line ND6634-2R was tested in the North Central Regional trial for the first time this year. This selection appears to have the potential of becoming a good table-stock variety for the Red River Valley. Line ND6634-2R seems to have fair chip quality especially when chipped directly out of the field. Line ND7196-18, a late blight resistant white, seems to have only fair adaptability. It seems to do the best in the southern part of the U. S. (Alabama) where it is grown under irrigation. When grown in the Red River Valley under dry conditions it will produce many undersized tubers and it will scab. The future of ND7196-18 has yet not been determined.

Some of the newer selections that performed quite well were ND7878-1, a white-skinned selection that chips out fairly well at 40° F (approximate) temperatures and ND8767-10R, a red. Line ND8947-2 Russ, a cross between White Rose and ND7733-14 Russ appears to be a promising long russet selection.

Processing and Culinary Tests. Processing tests were again done in cooperation with the Processing Lab at East Grand Forks, Minnesota, Wise Potato Chip Company and the Pillsbury Company. Other tests included a chip and cooking test done by the Horticulture Department. The chip test consisted of chipping 12 entries from the state-wide trial at Grand Forks and Park River. These samples were chipped on January 16 (out of 40° F temperature) and on January 30, February 6 and February 13, North Dakota Table 1 and 2. Cooking tests consisted of boiling and baking 28 entries from the Park River and Grand Forks variety trial.

Samples were checked for sloughing, mealiness, texture, and color, North Dakota Tables 3 and 4.

One hundred-ninety advanced selections were tested by the Processing Lab at East Grand Forks, Minnesota. Twenty selections from this material had an Agtron reading 40 or above when chipped on February 28.

Ten selections were tested by the Pillsbury Company for mash and flake quality. The samples were analyzed for physical, chemical, flake processing and sensory characteristics. However, in spite of the fact that several appeared to show promise as flaking varieties, they were not much better than Norchip.

Variety Trials. Replicated variety trials were again grown at Park River, Grand Forks, Minot, Carrington and Williston. Mr. Ben Hoag was in charge of the Minot trial and Mr. Ernest French the Williston trial. Mr. Howard Olson and Mr. Frank Sobolik conducted the Carrington trial while at Park River Mr. Wayne Grinde and Mr. Jerry Huebner were in charge. At Grand Forks Mr. Don Uhler was in charge of general maintenance of the trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block. Twenty-one entries were grown at Park River and Grand Forks while 15 entries were tested at Carrington in a dry land and irrigated trial. Twelve entries were planted at Minot and Williston. Marketable yields consisted of all U.S. No. 1 tubers over 1-7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing, fertilizer, soil type, planting and harvest dates of each location were as follows:

Location	Row	Plant	Fertilizer	Soil Type	Planting Date	Harvest Date
Grand Forks	38"	12"	20#/A 20-20-10	Bearden clay loam	5/8	9/27
Park River	36"	12"	300#/A 20-20-10	Glyndon silt loam	5/15	9/12
Minot	42"	14"	None	Williams loam	5/21	9/27
Williston	36"	14"	None	Williams loam	5/7	9/14
Carrington (irrig.)	36"	8"	500#/A 20-20-12	Kief loam	5/14	9/27
Carrington (dry land)	36"	12"	500#/A 20-20-12	Kief loam	5/14	9/27

The 1973 season was quite variable. At Park River it was quite wet during the entire growing season while at Grand Forks it was extremely dry. It was so extremely dry at Grand Forks that the salts in the alkaline areas moved up to

the soil surface and caused severe stunting of the plants and in some cases the salts caused a complete crop failure. At Minot there was adequate rainfall and the temperatures were near normal and at Carrington about eight inches of moisture fell during the growing season.

Red Pontiac was the highest yielding entry in trial. This can be expected during a year that is somewhat dry as Red Pontiac is quite drought resistant (North Dakota Table 5). The next highest yielding varieties were Chieftain, Kennebec, Viking, and Norchip. All of these varieties averaged over 200 cwt per acre when grown at the six locations in North Dakota. Line ND6634-2R had an overall average yield of 203 cwt per acre, while ND7196-18 and Norland had 180 cwt per acre yield. Line ND6634-2R produced 327 cwt per acre when grown at Park River.

In comparing the dry land trial, Park River produced the highest yield and Williston and Grand Forks the lowest yields. The irrigated trial again out-yielded the dry land trial at Carrington.

Line ND7103-4 and Norchip had the highest specific gravity or total solids at the six locations. These selections had average specific gravities of 1.086 for ND7103-4 and 1.084 for Norchip (North Dakota Table 6). All entries were much lower in specific gravities during the 1973 season. Red Pontiac with 1.072 produced the lowest specific gravity.

Disease

Disease Testing. Twenty-one advanced selections were evaluated for resistance to potato virus X (PVX) and potato spindle tuber virus (PSTV); of these selections, 6647-1R, 6647-4R, 7003-2 Russ, 7196-18 and 8494-3 Russ showed resistance to PVX although 7196-18 was not immune. In addition 6647-1R showed some resistance but not immunity to both viruses. PVX and PSTV virus indexing was carried out on 418 tubers of 122 selections from the Casselton quarantine plot, 132 tubers from 66 out-of-state selections, 1140 tubers of 570 seedling selections and 28 tubers from six miscellaneous selections. A total of 5.1 percent PSTV and 2.2 percent PVX tubers were identified; in addition a total of 19 tubers were found to be leafroll infected by the Florida test. To date the Scopolia sinenses test for PSTV has not been used as effectively as might be possible due to problems associated with seed production. Rooted cuttings are easily developed but are not any better than the tomato test; however, further work along these lines is anticipated.

Common scab and silver scurf resistance was field (scab and scurf) and storage (scurf) evaluated in 626 selections. Several new selections were resistant to both diseases, while 8850-2 was the only advanced resistant selection. Silver scurf resistance was very poor in most selections when evaluated after storage.

The selection 7196-18 continued to show excellent foliar resistance to late blight; in addition 8850-2 and 8691-10R are newer selections with late blight resistance.

Verticillium wilt resistance was found in the newer selections 8767-10R and 8297-1, while resistance was again apparent in 6647-1R. Wilt resistance has been evaluated by the dip and toothpick methods but will be supplemented with field resistance in a newly established field in Fargo.

North Dakota Table 1. 1973 Chip Tests of Varieties and Selections
Grown at Grand Forks, North Dakota During 1972.

	January 16			January 30			February 6			February 13		
	Color Photo		Yield	Color Photo		Yield	Color Photo		Yield	Color Photo		Yield
	Chart	Volt		Chart	Volt		Chart	Volt		Chart	Volt	
	1/	2/	3/									
Cascade	9.8	9.0	33.5	7.8	24.3	36.3	7.8	18.3	38.8	7.5	24.6	34.0
Kennebec	10.5	8.3	31.8	8.0	21.0	36.0	7.5	25.5	34.3	7.0	27.3	34.0
Norchip	8.5	10.6	32.5	7.5	21.8	37.8	7.0	29.9	37.8	6.5	29.8	35.8
6925-13 Russ	10.0	7.3	33.0	9.5	15.3	35.8	8.8	17.8	31.8	8.5	19.4	33.5
7103-4	9.8	13.6	35.3	6.5	25.9	37.3	6.8	28.3	35.0	6.5	26.5	35.0
7196-18	9.5	11.0	32.0	7.8	17.0	32.5	5.5	31.9	38.0	6.5	24.9	34.0
7642-2 Russ	10.0	7.5	32.0	8.0	16.0	34.0	8.0	17.0	30.5	No Tubers		
7642-3 Russ	10.8	7.0	32.0	10.0	12.3	32.8	10.0	12.1	33.3	9.5	11.5	33.3
7710-5	11.0	5.8	30.8	8.8	15.5	33.5	7.3	20.9	35.3	7.8	23.0	34.8
7878-1	7.5	14.7	29.8	6.0	29.8	34.5	5.8	31.8	34.3	5.3	36.3	34.3
8297-1	11.0	9.5	30.8	7.7	18.5	36.5	6.9	23.8	32.0	6.5	29.5	33.0
8608-2	10.5	15.3	31.8	7.0	19.3	37.3	9.5	15.3	32.8	6.3	28.5	34.5

1/ Color Chart - (1 light 11 dark).

2/ Photovolt - higher numbers are lighter in color.

3/ Yield - percent chip yield.

North Dakota Table 2. 1973 Chip Tests of Varieties and Selections
Grown at Park River During 1972.

	January 16			January 30			February 6			February 13		
	Color Photo		Yield	Color Photo		Yield	Color Photo		Yield	Color Photo		Yield
	Chart	Volt		Chart	Volt		Chart	Volt		Chart	Volt	
	<u>1/</u>	<u>2/</u>	<u>3/</u>									
Cascade	9.0	11.3	33.5	8.8	36.8	20.7	8.3	21.5	37.0	8.5	19.6	38.3
Kennebec	9.5	10.5	33.0	7.5	28.4	35.5	5.0	29.9	36.3	5.0	33.0	37.3
Norchip	9.5	15.8	35.0	6.3	33.9	34.0	5.3	34.4	39.5	5.0	38.5	38.8
6925-13 Russ	10.5	8.0	32.8	9.0	17.9	36.3	8.5	19.0	35.0	8.5	16.3	35.5
7103-4	9.8	11.8	30.8	8.3	24.5	35.3	7.0	27.1	37.8	5.0	35.6	36.0
7196-18	10.0	10.5	32.8	5.8	31.0	34.3	4.8	30.8	39.5	5.3	37.8	35.5
7642-2 Russ	11.0	10.0	32.3	8.5	17.5	33.0	10.3	12.9	34.3	9.8	11.8	34.8
7642-3 Russ	10.5	9.8	31.5	9.5	16.5	32.8	8.8	15.5	35.3	9.0	16.1	34.8
7710-5	11.0	9.0	30.5	7.0	24.9	31.8	6.5	23.9	35.3	5.8	31.5	35.0
7878-1	5.5	23.4	35.8	4.0	39.5	33.3	4.5	37.9	34.8	4.8	37.8	37.2
8297-1	10.5	10.3	32.3	7.3	26.0	32.3	7.3	24.8	34.3	7.5	21.8	34.8
8608-2	11.5	10.3	33.3	6.5	29.3	34.3	6.3	25.5	34.8	5.5	33.8	37.3

1/ Color Chart - (1 light 11 dark).

2/ Photovolt - higher numbers are lighter in color.

3/ Yield - percent chip yield.

North Dakota Table 3. 1973 Cooking Tests of Varieties and Selections Grown at Grand Forks, North Dakota During 1972.

Varieties	BOILING TEST					BAKING TEST		
	Slough- ing 1/	Meali- ness 2/	Tex- ture 3/	Color After Cook- ing 4/	Color 4 hrs. After Cook- ing 5/	Meali- ness	Texture	Color
Chieftain	8.8	8.5	8.6	9.3	8.5	7.5	7.0	8.5
Cascade	9.3	9.0	8.5	8.8	8.0	8.3	8.3	8.3
Kennebec	9.3	9.0	8.5	9.0	8.5	8.3	8.3	8.3
Norchip	9.5	9.3	8.5	9.5	8.5	9.3	9.0	8.8
Norgold Russet	9.5	9.3	8.8	9.8	8.8	9.3	9.3	9.5
Norland	8.8	8.3	8.3	8.8	8.3	8.0	8.0	8.5
Russ Burbank	9.3	9.0	8.5	9.0	8.8	9.0	8.3	8.3
Red Pontiac	8.8	8.0	8.0	8.8	8.3	8.0	7.8	7.5
Viking	8.8	8.3	8.0	9.3	7.8	8.0	7.8	9.0
6634-2R	8.3	7.8	7.8	7.8	7.3	7.3	7.3	7.5
6647-1R	8.0	7.5	7.8	7.3	6.8	6.5	6.5	7.0
6647-4R	8.3	7.5	7.8	7.3	6.5	7.0	7.0	7.0
6925-13 Russet	8.3	8.0	8.0	8.8	8.3	7.5	7.5	7.3
7103-4	9.8	9.3	8.5	9.0	8.5	9.0	8.8	9.0
7196-18	9.3	9.0	8.5	8.8	8.0	8.5	8.3	8.5
7642-2 Russet	8.3	7.8	7.8	7.8	6.8	7.5	7.3	7.3
7642-3 Russet	8.8	7.5	8.0	7.3	7.0	7.5	7.5	8.3
7688-3R	8.8	7.3	7.8	9.5	8.5	7.5	7.3	8.3
8105-1R	9.0	7.5	8.0	8.5	7.5	7.5	7.3	7.8
7710-5	8.5	8.3	8.3	9.0	8.5	8.0	7.5	8.5
7878-1	9.3	8.8	8.5	9.8	8.8	9.0	8.5	8.8
8168-6R	8.8	7.8	8.0	8.8	8.3	6.8	6.8	7.3
8202-2R	8.5	7.8	7.8	9.8	8.5	7.0	6.8	7.5
8243-4R	8.8	8.3	8.0	9.0	8.5	7.3	7.3	7.5
8243-11R	8.3	7.8	7.8	8.3	8.0	7.8	7.3	8.0
8297-1	9.0	8.5	8.3	8.5	7.5	8.5	8.0	8.3
8608-2	8.8	8.5	8.0	8.5	7.8	8.0	8.0	8.0
DT6063-1R	9.5	9.0	9.0	8.8	8.5	8.3	8.3	8.3

1/ 1 severe sloughing, 10 no sloughing. 2/ 1 not mealy, 10 very dry & mealy. 3/ 1 poor texture, 10 good texture.
 4/ 1 dark color, 10 very white color. 5/ 1 dark color, 10 very white color. 6/ 1 poor flavor, 10 good flavor.

North Dakota Table 4. 1973 Cooking Tests of Varieties and Selections Grown at Park River, North Dakota During 1972.

Varieties	Slough- ing 1/	Mealiness 2/	Texture 3/	Color		Mealiness	Texture	Color		Flavor 6/
				Immed. After Cooking 4/	Color After Cooking 5/			Color	Flavor 6/	
Chieftain	8.0	8.0	8.0	8.8	8.3	7.5	7.0	8.5	8.0	
Cascade	8.8	8.5	8.5	8.8	8.0	8.3	8.3	8.3	8.3	
Kennebec	9.0	8.5	8.3	8.3	7.5	9.0	8.3	8.0	8.5	
Norchip	9.0	9.0	9.0	8.8	8.5	9.3	8.8	8.5	9.0	
Norgold Russet	9.5	9.5	9.3	9.3	9.0	9.3	8.8	9.3	9.3	
Norland	8.0	8.0	8.0	8.8	7.8	7.8	8.0	8.3	8.5	
Russ Burbank	8.3	8.3	7.8	8.3	7.8	8.8	8.5	8.0	7.5	
Red Pontiac	7.8	8.0	7.8	8.5	7.5	7.5	7.5	7.3	7.8	
Viking	8.5	8.3	8.0	9.3	8.3	8.5	8.0	8.8	7.5	
6634-2R	8.3	7.8	8.0	8.5	8.0	7.5	7.5	8.5	8.3	
6647-1R	7.3	7.3	7.3	7.0	6.5	7.0	7.0	7.3	7.3	
6647-4R	8.0	8.0	7.5	7.0	6.8	7.5	7.5	7.0	7.5	
6925-13 Russ	8.8	8.5	8.3	9.0	8.3	8.0	8.0	8.3	8.3	
7103-4	9.5	9.5	9.0	9.3	8.0	8.8	8.5	8.8	9.0	
7196-18	9.3	9.3	8.8	8.8	8.0	8.3	8.0	8.0	8.3	
7642-2 Russ	7.8	7.5	7.8	7.0	6.5	7.3	7.3	7.0	8.0	
7642-3 Russ	7.0	7.0	7.0	7.3	6.8	7.3	7.0	7.0	7.8	
7688-3R	8.3	8.0	7.8	9.0	8.8	7.5	7.3	7.8	7.5	
8105-1R	7.5	7.8	7.5	8.5	8.0	6.8	6.8	7.5	7.5	
7710-5	8.3	8.3	8.0	8.8	8.3	8.5	8.0	8.3	8.5	
7878-1	9.0	9.0	8.8	8.8	8.3	8.8	8.3	8.5	8.5	
8168-6R	8.0	7.8	7.5	8.3	7.5	7.3	7.3	7.8	8.0	
8202-2R	8.0	7.8	7.5	8.8	7.5	7.0	7.0	7.0	7.5	
8243-4R	7.5	7.0	7.3	8.5	7.8	7.3	7.0	7.0	7.3	
8243-11R	7.5	7.5	7.5	9.0	8.5	7.8	7.8	8.0	8.0	
8297-1	8.8	8.8	8.5	8.0	7.8	8.5	8.0	8.0	8.5	
8608-2	8.0	8.0	8.3	7.8	7.3	7.5	7.3	7.3	7.5	
DT6063-2	8.3	8.5	8.5	8.5	7.5	8.0	7.8	7.0	7.8	

1/ 1 severe sloughing, 10 no sloughing.
 2/ 1 not mealy, 10 very dry & mealy.
 3/ 1 poor texture, 10 good texture.

4/ 1 dark color, 10 very white color.
 5/ 1 dark color, 10 very white color.
 6/ 1 poor flavor, 10 good flavor.

North Dakota Table 5. Marketable Yield and Percent United States No. 1 of Varieties and Selections Grown in State-Wide Potato Trials, 1973.

Grand Forks	Park River		% US		Carrington		% US		Williston		% US		Minot		% US		Average
	cwt/A	No. 1	cwt/A	No. 1	% US	Irrig. % US	No. 1	cwt/A	% US	No. 1	cwt/A	% US	No. 1	cwt/A	% US	No. 1	
Chieftain	142	91	316	80	381	96	213	94	87	79	148	80	215				
Kennebec	126	88	340	81	346	95	203	94	118	89	152	71	214				
Norchip	127	82	375	84	336	95	172	84	119	86	118	74	208				
Norgold Russet	127	83	338	83	284	92	169	89	83	85	93	59	182				
Norland	104	80	323	90	284	94	153	92	89	87	127	77	180				
Red Pontiac	176	88	409	85	402	95	233	94	104	91	144	75	245				
Russet Burbank	20	36	154	48	240	91	126	83	73	65	91	60	117				
Viking	152	98	388	94	290	96	177	97	117	95	133	82	210				
6634-2R	196	94	327	85	327	94	187	91	80	83	103	68	203				
7103-4	76	89	211	89	182	93	92	86	85	92	182	69	121				
7196-18	120	75	302	74	326	92	175	84	72	73	85	52	180				
7643-2 Russ	85	86	285	84									185				
7710-5	101	60	265	90									183				
7878-1	109	85	236	83	248	94	96	87					173				
8200-4R	109	79	343	82									226				
8297-1	95	76	225	73	224	91	102	67	73	71	69		131				
8691-10R	101	64	333	81	300	94	169	87					226				
8730-13R	67	83	306	87									186				
8767-10R	91	88	325	85									208				
8844-7R	55	61	270	79									163				
CS230-14	76	78	182	85	86	90	37	88					95				
Average	107		298		284		151		92		120		183				

North Dakota Table 6. Specific Gravity 1/ and Total Solids of Varieties & Selections Grown In State-wide Potato Trials, 1973.

Grand Forks	Park River		Carrington Irrig.		Carrington Dryland		Willi- ston		Minot		Average		
	Sp. gr.	Solids	Sp. gr.	Solids	Sp. gr.	Solids	Sp. gr.	Solids	Sp. gr.	Solids	Sp. gr.	Solids	
Chieftain	75.5	18.6	69.3	71.8	18.0	71.0	17.7	92.5	22.4	81.5	20.1	76.9	19.0
Kennebec	66.5	16.9	69.5	76.0	18.8	70.5	17.7	89.0	21.6	85.5	20.9	76.2	18.8
Norchip	82.8	20.3	79.5	82.5	20.3	81.8	20.1	93.3	22.4	86.0	20.9	84.3	20.5
Norgold Russet	79.0	19.4	75.0	74.0	18.4	81.0	19.9	94.5	22.9	86.5	21.2	81.7	20.1
Norland	73.3	18.2	71.8	69.5	17.5	75.8	18.8	88.5	21.6	81.5	20.1	76.7	19.0
Red Pontiac	68.0	17.1	65.8	68.0	17.1	64.7	16.5	84.8	20.7	80.5	19.9	72.0	18.0
Russet Burbank	63.0	16.0	71.0	79.0	19.4	72.5	18.2	82.5	20.3	85.0	20.7	75.5	18.8
Viking	75.8	18.8	71.5	69.8	17.5	76.5	19.0	90.0	21.8	83.5	20.5	77.9	19.2
6634-2R	77.3	19.0	73.3	69.8	17.5	77.8	19.2	91.5	22.2	84.5	20.5	79.0	19.4
7103-T	83.8	20.5	80.3	78.3	19.2	89.8	21.8	94.8	22.7	90.3	21.8	86.2	20.9
7196-18	73.8	18.4	78.3	77.3	19.0	84.0	20.5	92.3	22.2	85.3	20.7	81.8	20.1
7642-2 Russ	76.8	19.0	73.0									74.9	18.6
7710-5	75.0	18.6	72.3									73.7	18.4
7878-1	76.5	19.0	67.8	62.0	15.8	77.5	18.8					71.0	17.7
8200-4R	89.8	21.8	84.8									87.3	21.2
8297-1	77.5	19.2	76.3	74.3	18.4	78.8	19.4	93.8	22.7	86.3	20.9	81.2	19.9
8691-10R	82.3	20.1	75.5	78.3	19.2	82.3	20.1					79.6	19.6
8730-13R	75.5	18.8	64.5									70.0	17.5
8767-10R	79.5	19.7	80.3									79.9	19.7
8844-7R	76.3	18.8	73.8									75.1	18.6
CS230-14	67.5	17.1	70.3	72.0	18.0	73.0	18.2					70.7	17.7

1/ 1.0 omitted from specific gravity readings.

OHIO

Floyd Lower, A. R. Mosley, E. C. Wittmeyer, R. E. Partyka, David Kelly

Potato Variety Trials - 1973

The work was done under a cooperative arrangement between the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University, the Ohio Potato Growers Association and local growers. The purpose is to test promising new varieties under various farm practices and conditions.

Nine varieties were planted in three replicates on each of six Ohio farms. They were also planted on the muck experimental farm at Celeryville. In addition to the main study on the six farms, 13 varieties, including seven of the nine, were tested in a similar manner on a southern Ohio sandy soil for early market; and 19 selections were tested in small duplicated plots on two of the six farms to find the most promising new cultivars for the main study the following year. This report concerns only the main study on the six farms. A complete report including all of the work is available. The data in the tables are the averages of the six farms.

Each plot consisted of two rows, in each of which 50 seedpieces were planted. Seed spacing varied from 9 to 11 inches in the row and 32 to 34 inches between rows. Each grower followed his usual field practices in planting, fertilization, culture, and spraying. Planting dates varied from May 5 to June 15. The seed was cut shortly before planting in each case and was dusted with polyram.

Fertilizer practices varied somewhat but were generally equivalent to about 1,000 to 1,400 pounds of 10-20-20 per acre with additional nitrogen plowed down on three of the six farms. Farm one had a sandy loam, while the other five farms had various types of silt loam.

Stand, vigor, and disease were evaluated during the growing season. The tubers were weighed when harvested, and a fifty-pound sample was then collected from each plot for grading. Samples of marketable tubers were then collected for tests on stem-end discoloration, specific gravity, chipping quality and storage.

The spring of 1973 was quite wet which delayed planting on all farms, in some cases for three weeks. Rainfall was fairly well distributed from June through August, although in some cases a bit deficient in early July and early August. Moisture during the growing season varied greatly from farm to farm. However, on the farms with the lesser amounts, the potatoes apparently did not suffer for lack of water probably due to the vast soil reserves from the heavy spring rains. Temperatures during the growing season were about normal. There were no prolonged periods of high temperature as in some years.

The percent of perfect stand was lower than usual, the average being but 78.2. The stand dropped with the delay in planting for some varieties, especially Superior and Shurchip. The average stand ranged from 68 for Penn 71 to 84 for Abnaki. Very little virus or other disease showed in the field. The plant symptoms of fusarium and/or verticillium wilt were observed on farm number six on several plants in each replicate of Superior, Penn 71, and Kennebec. On the tubers at harvest, a slight amount of scab was seen in some cases. Enlarged lenticels, not a disease, was common on many cultivars where rainfall had been rather heavy this fall.

Superior and Katahdin were included as standards for grade, yield, and other responses; and Kennebec was included as a chip quality standard. Hudson (NY41) produced the highest total and marketable yields, as it did in 1971 and 1972, the two other years evaluated. Shurchip was second in marketable yields, as was the case the two previous years. Kennebec was third. The average marketable yields in cwt. per acre for the six farms were as follows: Hudson, 298; Shurchip, 280; Kennebec, 265; Norchip, 261; Superior, 261; Penn 71, 256; Katahdin, 256; 6RF1, 253; and Abnaki, 249. In the two previous years when Abnaki was evaluated, it yielded near the top. Comparison of Hudson and Superior may be somewhat misleading since Superior is an early variety.

Specific gravity and chip tests were made at Ohio State University by Dr. Wilbur A. Gould, and are reported separately. The term "marketable yield" used in the tables is essentially synonymous with U.S. No. 1 grade, i.e., A size tubers fairly free of external defects.

Ohio Table 1. Summary of average yield and other data, main plots, Ohio Potato Variety Trials--1973
(Listed in order of maturity)

Variety	Percent Stand	Weight of 40 tubers lbs.	Percent Size "B"	Percent Culls	Major Defects	Percent Marketable	Mkt. yield Cwt./Acre
Superior	74.3	16.1	3.8	6.9	Sh.Gr.	89.3	260.93
Penn 71	67.9	16.9	2.9	13.6	Sh.Gr.	83.5	256.38
Abnaki	83.6	14.9	4.3	11.0	Gr.Sh.	84.6	249.25
Norchip	80.6	13.2	7.7	10.7	Sh.Gr.	81.7	261.33
Shurchip	74.3	14.8	5.6	9.5	Sh.	84.4	280.45
Katahdin	82.0	14.9	4.0	10.1	Gr.Sh.	85.9	256.12
Kennebec	79.5	17.5	3.5	21.4	Sh.Gr.	75.1	264.95
Hudson	80.9	17.0	3.8	11.8	Gr.Sh.	84.4	298.08
6RF1	75.0	12.2	8.2	8.8	Gr.Sh.	83.0	253.31
Average	78.2	15.3	4.9	11.6		83.5	264.70

1/ Sh. = rough shape
Gr. = sun greening
Cr. = growth cracks
Sc. = scab

Ohio Table 2. Average yields of marketable potatoes by variety and by farm, in cwt. per acre, main plots,
Ohio Potato Trials 1973 (Listed in order of yield)

Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6
Hudson	410.94	281.56	Hudson	396.99	375.54
6RF1	369.97	227.93	Katahdin	373.13	353.10
Shurchip	367.01	209.04	Superior	355.72	340.12
Norchip	366.62	203.24	Norchip	349.28	338.36
Abnaki	353.42	196.78	Penn 71	348.81	318.12
Katahdin	317.76	193.16	Shurchip	348.17	316.80
Superior	309.88	189.55	Abnaki	335.50	312.40
Kennebec	291.76	155.57	Kennebec	332.84	309.54
Penn 71	280.13	139.70	6RF1	292.61	254.76
Average	340.83	200.17	131.63	349.23	324.30
					242.03

Average	
Hudson	298.08
Shurchip	280.45
Kennebec	264.95
Norchip	261.33
Superior	260.93
Penn 71	256.38
Katahdin	256.12
6RF1	253.31
Abnaki	249.25
Average	264.70

Ohio Table 3. Average yields in cwt. per acre of marketable potatoes tested in eleven years--1963-1973
(using nearest whole numbers)

Variety	1969	1970	1971	1972	1973 ^{1/}	Average cwt./A for years tested	Total years	Number Reps.
Haig			310	289	221*	252	6	60
Superior			275	227	255	264	11	143
Penn 71	308	265			251	251	1	23
Abnaki			319	298	239	285	3	54
Norchip	282	355	294	284	259	297	6	99
Shurchip	385	382	335	305	284	337	5	85
Katahdin	290	344	285	277	247	298	11	147
Kennebec				285	262	307	7	81
Hudson			347	346	298	330	3	58
6RF1					253	253	1	19

Other varieties tested more than two years during the eleven year period

Variety	Years tested	Average cwt./A	Total years	Number Reps.
Cobbler	1963, 64, 65, 72*	248	4	30
Alamo	1968, 69, 70, 71, 72*	285	5	61
Snowflake	1963, 64, 65, 66	250	4	35
Norgold Russet	1964, 65, 66	248	3	26
LaChipper	1963 to 1969	296	7	72
Platte	1967, 68, 69	297	3	37
Monona	1966 to 1971	268	6	73
Peconic	1968, 69, 70, 71	310	4	59
Arenac	1963, 64, 65, 66	263	4	35
Penobscot	1966, 68, 69	318	3	25
B5141-6	1967, 68, 69	321	3	39
Sebago	1963 to 1967	282	5	45
Ona	1963 to 1968	305	6	58

^{1/} Include early market plots on one farm

* On early market farm only

PENNSYLVANIA

Clarence S. Bryner

In 1973, Extension variety demonstrations were conducted in cooperation with county extension agents and potato growers in the following counties: Potter, Somerset, Schuylkill, Lehigh, and York. Eleven varieties and two seedlings were evaluated for yield and other characteristics.

Cultural Information

<u>County</u>	<u>Grower</u>	<u>Planting Date</u>	<u>Harvest Date</u>	<u>Planting to Harvest Days</u>
Lehigh	R. Ringer	4/23	9/25	155
Potter	F. Irish	5/2	9/17	138
Schuylkill	E. Dresher	4/25	9/20	148
Somerset	R. & T. Croner	5/23	10/2	132
York	W. W. Warner & Sons	4/19	9/26	160

All demonstrations were planted as randomized blocks with four replications. Cut seedpieces of each variety were hand planted in single 25-foot row plots, 9 inches apart within the row. Rows were 34 inches apart. Seedpieces of red or white potatoes were planted in the 5-foot breaks between plots to separate the plots at harvest time.

Total yields were recorded at harvest, and tubers were graded for sizes 1-7/8 to 2 $\frac{1}{4}$ inches and 2-3/8 inches up.

Fertilizer Applied

<u>County</u>	<u>Previous Crop</u>	<u>Plow Down</u>	<u>Row</u>
Lehigh	Clover	4 tons poultry manure	800 lbs. 16-8-8
Potter	Potatoes		800 lbs. 15-15-15
Schuylkill	Wheat	700 lbs. 10-6-4	1500 lbs. 10-6-4
Somerset	Alfalfa	600 lbs. 0-10-40	1000 lbs. 15-15-15
York	Corn	8 tons cattle manure	1200 lbs. 10-10-10

Specific Gravity Determinations and Chip Color Rating

Specific gravity was determined by the weight in air-and-water method. Single varietal samples were composited from four replications at each location.

Chip-color ratings are an average of three fries made during the period 10/15/73 to 11/30/73 on potatoes stored at 58° to 65° F. Ratings are on a scale of 1 to 14 with 1 being white and 4 acceptable. Chips rating 5 are borderline in color.

The specific gravity determinations and chip-color ratings were made by James Watts, Horticulturist, Wise Foods Division, Borden Incorporated, Berwick, Pennsylvania.

Pennsylvania Table 1, 2, 3. Stand, yield, size distribution, specific gravity and chip color rating of potato varieties and seedlings in Extension trials in 1973.

Variety	% Stand	Total Cwt./A	Yield 1-7/8" Up	Percentage		Specific Gravity 1.0+	Chip Color
				1-7/8" to 2 1/4"	2-3/8" Up		
<u>Lehigh</u>							
Hudson	91	491	472	11	89	655	5.3
Viking	95	475	461	8	92	655	-
Kennebec	98	444	421	11	89	610	4.3
Chieftain	99	418	395	13	87	614	-
Line 6RF-1	97	434	388	23	77	633	4.3
Katahdin	96	416	387	14	86	667	3.7
Norchip	96	389	366	19	81	714	3.7
Line 6CX-6	100	365	338	18	82	699	3.0
Cascade	78	369	332	17	83	688	-
Superior	99	337	328	11	89	621	5.0
Penn 71	91	328	310	15	85	646	2.7
Monona	96	319	302	14	86	558	3.0
Norland	92	275	253	24	76	569	-
Average	94	389	365	15	85	641	3.9

<u>Potter</u>							
Kennebec	100	210	192	37	63	711	4.3
Cascade	97	229	187	45	55	775	-
Chieftain	98	229	187	41	59	664	-
Line 6CX-6	100	198	170	44	56	792	3.0
Katahdin	97	200	164	58	42	709	5.3
Penn 71	91	174	157	41	59	747	3.0
Hudson	91	186	155	45	55	757	7.3
Superior	100	173	139	49	51	711	5.3
Norchip	98	171	132	59	41	757	3.7
Line 6RF-1	100	158	120	52	48	725	6.0
Viking	98	137	112	48	52	712	-
Norland	100	137	81	76	24	614	-
Monona	98	85	67	67	33	678	2.7
Average	97	175	143	51	49	719	4.5
Penn 71*	91	261	247	20	80	737	-

*Systemic insecticide (knife) sidedressed 40 days after planting. No row systemic on other plots.

<u>Schuykill</u>							
Hudson	84	446	436	9	91	599	4.7
Kennebec	97	453	432	12	88	602	3.0
Cascade	94	421	392	15	85	613	-
Line 6RF-1	97	419	381	22	78	569	2.7
Penn 71	95	375	361	9	91	636	2.0
Katahdin	99	376	358	13	87	631	3.7
Viking	97	356	345	8	92	635	-
Norchip	98	361	343	16	84	701	2.0
Superior	100	357	341	11	89	667	2.7
Chieftain	96	346	330	16	84	611	-
Monona	100	308	292	15	85	600	2.0
Norland	99	302	280	23	77	569	-
Line 6CX-6	99	296	266	25	75	646	2.7
Average	97	370	350	15	85	621	2.8

Pennsylvania Table 4, 5, 6. Stand, yield, size distribution, specific gravity and chip color rating of potato varieties and seedlings in Extension trials in 1973.

Variety	% Stand	Total Cwt./A	Yield 1-7/8" Up	Percentage		Specific Gravity 1.0+	Chip Color
				1-7/8" to 2 1/4"	2-3/8" Up		
<u>York</u>							
Hudson	91	312	305	9	91	929	3.7
Cascade	98	342	302	27	73	921	-
Chieftain	98	303	289	16	84	698	-
Viking	100	281	271	19	81	780	-
Line 6RF-1	94	269	246	26	74	868	2.7
Kennebec	98	266	245	26	74	860	3.0
Penn 71	93	250	237	21	79	793	2.0
Norchip	91	238	214	34	66	916	2.0
Katahdin	97	225	213	20	80	812	3.7
Line 6CX-6	97	233	211	24	76	929	2.0
Superior	100	224	198	39	61	811	2.0
Monona	95	204	172	33	67	725	2.0
Norland	98	170	140	54	46	610	-
Average	96	255	234	27	73	819	2.6
<u>Somerset</u>							
Cascade	94	632	612	14	86	735	-
Line 6RF-1	98	634	610	14	86	681	5.7
Kennebec	99	615	600	11	89	699	3.7
Penn 71	94	522	508	10	90	664	2.0
Hudson	92	511	495	10	90	656	5.3
Katahdin	96	483	466	11	89	588	5.0
Line 6CX-6	100	474	456	15	85	794	3.0
Norchip	98	419	400	16	84	712	2.3
Chieftain	98	418	393	16	84	611	-
Superior	100	393	379	14	87	702	3.0
Viking	98	354	342	8	92	646	-
Monona	98	357	333	17	83	569	2.3
Norland	98	250	224	33	67	590	-
Average	97	466	447	15	85	665	3.6
<u>Five County Average</u>							
Kennebec	98	397	378	19	81	696	3.7
Hudson	90	389	373	17	83	719	5.3
Cascade	92	398	365	24	76	748	-
Line 6RF-1	97	382	349	27	73	695	4.3
Chieftain	98	342	318	20	80	640	-
Katahdin	97	340	318	23	77	681	4.3
Penn 71	93	329	315	18	82	697	2.3
Viking	98	320	306	18	82	686	-
Norchip	96	315	291	29	71	760	2.7
Line 6CX-6	99	313	288	25	75	772	2.7
Superior	100	296	277	25	75	702	3.6
Monona	97	254	233	29	71	626	2.4
Norland	97	226	195	42	58	590	-
Average	96	331	308	24	76	693	3.5

PENNSYLVANIA

J. D. Harrington

Potato variety trials were conducted at the Agronomy Research Farm near Rock Springs in central (Centre County) Pennsylvania in 1973.

Soil at the experimental site was deep, heavy, well-drained and slightly acidic in pH. Prior to varietal hand planting, rows were furrowed out three feet apart and simultaneously treated with systemic insecticide and commercial fertilizer. Varieties received 150-100-100-30 lb/A N, P_2O_5 , K_2O and Mg, respectively. Normal cultural practices were conducted throughout the growing season.

Seed for 16 varieties and seedling numbers was Maine grown and obtained from either the United States Department of Agriculture or the Maine Department of Agriculture. Seed of Penn 71, 6CX6, 6RF1, Hudson, and Viking was obtained in Pennsylvania. Seedpieces (four-cut) were planted nine inches apart within 25-foot, single-row plots with a three-foot break between plots. A randomized block design with four replications for each of the three maturity groups (early, medium, and late) was employed. Planting was done on May 2.

Varieties were mechanically harvested with a "Braco" single-row harvester and bagger attachment on October 15 (166 days after planting). Soil moisture was not limiting. Varieties were subjected to an extremely wet spring and irrigation water, when warranted, was supplied throughout the growing season.

Production and Quality Indices. Varietal maturity, tuber production, and tuber quality indices were obtained as follows:

Maturity: final grouping determined by percent of vegetative tops naturally dead 114-, 118-, 127-, 138-, or 148-days after planting.

Total yield, cwt/A: tubers $1\frac{1}{2}$ inches and larger in diameter were harvested from plots and weighed, and total plot weights were converted to hundredweight yields per acre.

Size A yield, cwt/A, and percent: harvested tubers from each plot were sized, and tubers $1\frac{7}{8}$ inches (minimum) and larger in diameter were converted to hundredweight yields per acre. Size A, also, includes at least 40 percent of the potatoes $2\frac{1}{2}$ inches or larger in diameter.

Size B yield, cwt/A: harvested tubers from each plot were sized and tubers from $1\frac{1}{2}$ to $2\frac{1}{4}$ inches (maximum) in diameter were converted to hundredweight yields per acre.

Bakers, cwt/A: harvested tubers from each plot were sized, and tubers 3 inches and larger in diameter were converted to hundredweight yields per acre.

Specific gravity: determined from approximately eight-pound tuber samples by the air-and-water method.

Chip yield, lb/100 lb: an estimate of the pounds of chips obtained from 100 pounds of raw peeled potatoes. Eight-ounce raw samples, peeled and washed and sliced 1/16-inch thick were fried to obtain chip yield.

Chip color, Rd: determined with the Gardner Color Difference Meter. Instrument was standardized against color standard C-LY-1047-57. Rd (reflectance) values 20.0 and above may be considered acceptable for marketing.

All potato quality indices were determined on tubers $2\frac{1}{2}$ inches in diameter size and within 29 days after harvest at the Agronomy Research Farm or the Department of Horticulture's Food Processing Laboratory. Tubers were stored in dry barns until grading and chipping without facilities for control of temperature or humidity.

Results. Summarized highlights of the research results were as follows:

The nine late maturing varieties averaged highest in total yields per acre, 311 cwt, whereas the six medium- and six early-maturing varieties averaged 219 and 197 cwt, respectively. Late maturing varieties produced tubers highest in specific gravity, 1.081, but chips darkest in color, 10.9 Rd 29 days after harvest. Tuber specific gravity of medium- and early-maturing varieties was 1.076 and 1.073 whereas chip color was 12.4- and 12.6- Rd, respectively.

Highest total yields per acre of early-, medium-, and late-maturing varieties were obtained for B6969-2 (242 cwt), Viking (265 cwt), and Cascade (370 cwt). Lowest yields per acre were produced by Seminole (150 cwt), Abnaki (168 cwt), and Bake King (257 cwt).

Changes in varietal ranking for total yields compared with Size A yields per acre were minor. Varieties which produced the highest and lowest total yields per acre also produced the highest and lowest Size A yields. All varieties produced at least 40 percent of their total yields $2\frac{1}{2}$ inches or larger in diameter (minimum for Size A potatoes). However, some varieties produced a higher or lower percentage of their tuber $2\frac{1}{2}$ inches or larger in diameter.

Highest Size A yields per acre of early-, medium-, and late-maturing varieties were obtained from Superior (226 cwt), Viking (253 cwt), and Cascade (338 cwt). Lowest Size A yields per acre were produced by Seminole (138 cwt), B6955-24 (151 cwt), and Bake King (238 cwt).

Varieties with the highest percentage of the total yield $2\frac{1}{2}$ inches or larger in size for each maturity group were B6995-19 (70%), Viking (77%), and Hudson (84%). Varieties producing the lowest total yield $2\frac{1}{2}$ inches or larger in size were Norland (48%), B6955-24 (50%), and 6RF1 (56%).

Lowest Size B yields per acre of early-, medium-, and late-maturing varieties were obtained from Seminole (48 cwt), Abnaki (40 cwt), and Hudson (50 cwt). Highest Size B yields per acre were produced by Norland (94 cwt), Norchip (109 cwt), and 6RF1 (160 cwt).

Highest bakers yields per acre of early-, medium-, and late-maturing varieties were obtained from B6969-2 (32 cwt), Viking (36 cwt), and Hudson (144 cwt). Lowest bakers yields per acre were produced by Norland (3 cwt), B6955-24 (0 cwt), and Raritan (28 cwt).

Varieties showing the higher specific gravities produced the higher yields of chips. Varieties of lower specific gravity produced fewer pounds of chips per 100 pounds of potatoes.

Highest specific gravity tubers for each maturity group were as follows: Seminole, 1.091; B6955-24, 1.086; and Raritan, 1.093. Lowest specific gravity varieties were Norland, 1.062; Chieftain, 1.068; and Cascade, 6RF1, and Katahdin, 1.076.

None of the 21 varieties produced chips sufficiently light in color (20.0 Rd and higher) after harvest to be considered commercially acceptable.

Varieties which produced chips lightest in color for each maturity group were Monona, B6955-24, and Penn 71. Varieties which produced the darkest colored chips were Norland, Viking, and Bake King.

Pennsylvania Table 1. Production and tuber quality indices of potato varieties grown in central Pennsylvania, 1973.

Variety or Seedling	PRODUCTION INDICES				QUALITY & CHIP INDICES ¹		
	Total yield, cwt/A	Size A yield, cwt/A	Size A yield, %	Size B yield, cwt/A	Bakers yield, cwt/A	Spec. grav.	Chip yield, lb/100 lb color, Rd
<u>Early Maturity</u>							
B6969-2	242	222	64	87	32	1.073	29.4
Superior	240	226	69	73	22	1.075	29.6
B6995-19	188	173	70	56	27	1.067	28.8
Norland	182	158	48	94	3	1.062	26.4
Monona	178	165	62	66	17	1.069	29.4
Seminole	150	138	68	48	14	1.091	33.2
L.S.D. (.05)	43	41	11	29	17	0.004	1.9
C.V., %	14.6	15.2	11.3	27.0	59.4	0.2	4.4
<u>Medium Maturity</u>							
Viking	265	253	77	62	36	1.071	28.0
Chieftain	260	236	61	101	16	1.068	28.1
Norchip	242	217	55	109	12	1.084	33.0
Wauseon	206	187	69	63	28	1.074	29.5
B6955-24	171	151	50	86	0	1.086	31.4
Abnaki	168	157	76	40	28	1.073	30.8
L.S.D. (.05)	62	61	9	21	23	0.004	1.9
C.V., %	18.9	20.3	9.1	17.7	76.6	0.3	4.2
							2.7
							14.3

Pennsylvania Table 1. (Continued)

Variety or Seedling	PRODUCTION INDICES				QUALITY & CHIP INDICES ^{1/}		
	Total yield, cwt/A	Size A yield, cwt/A	% yield,	Size B yield, cwt/A	Bakers yield, cwt/A	Spec. grav.	Chip yield, lb/100 lb color, Rd
<u>Late Maturity</u>							
Cascade	370	338	72	104	83	1.076	30.4
6RF1	367	328	56	160	31	1.076	30.8
Kennebec	354	331	76	87	70	1.079	30.0
Hudson	322	311	84	50	144	1.077	30.4
Katahdin	290	275	75	71	50	1.076	30.6
6CX6	287	260	66	97	55	1.083	32.5
Penn 71	277	263	75	68	47	1.077	30.0
Raritan	275	246	60	106	28	1.093	33.7
Bake King	257	238	65	89	34	1.088	31.3
L.S.D. (.05)	52	51	9	30	29	0.005	2.2
C.V., %	11.4	12.2	8.7	22.6	32.9	0.3	4.8

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^{1/} Specific gravity determined 11/6; chipped 11/13, 29 days after harvest

TEXAS (WEST)

J. Creighton Miller, Jr.

Variety Development and Testing

Seedling Program. Approximately 5,000 first year seedlings were grown at Lubbock, Texas in 1973. Seedlings were provided by Dr. Robert H. Johansen of North Dakota State University, and were primarily from families containing russet types. Eighty-nine clones were selected for further study and testing. These clones will be indexed for spindle tuber virus in Alabama field test plots and virus-free clones will be subjected to further testing in Texas and North Dakota.

Adaptation Trials. The objective of the adaptation trials in 1973 was to test as many advanced selections and named varieties over as many locations as possible. Over 100 entries were grown in replicated trials at four locations in West Texas; however, not all entries were included at each locale. Seed potatoes were obtained from breeding programs in North Dakota, Beltsville (grown in Maine), Louisiana (grown in Wisconsin), New York, Minnesota, Michigan, Nebraska, and Campbell Institute for Agricultural Research (grown in Maine). The Campbell material is not included in this segment of the report.

An additional study, not included herein, was conducted with the three principal varieties grown in this area: Norgold Russet, Red La Soda and Viking. This preliminary study indicated that difference in performance may exist among seed of the same variety but obtained from different sources.

Specific gravities were generally low, which is typical for the area. Peconic consistently proved to be a high specific gravity potato.

The North Dakota advanced selections shown in Table 1 were harvested 102 days after planting. Lines ND9109-8R and ND8843-12R, both round reds, performed well. Lines ND8913-4 Russ and ND8917-5 Russ both appear very promising and the latter had large tubers with excellent tuber type.

In general, the outstanding red varieties, harvested after a normal growing season (tables 2-5), were Red La Soda, Viking, La Rouge, Minn 3935, Red Norland and Minn 3866. In general, Norgold Russet was the outstanding russeted entry.

White entries performing well at one or more locations were Norchip, Alamo, Minn 3915, Reliance, Peconic, L71-110 and ND7196-18.

Results from the seed source study mentioned above and data presented in tables 4 and 5 indicate that Norgold Russet late strain and "x free" Red La Soda from Nebraska did not yield as well as regular Norgold or regular Red La Soda. These strains are both more vigorous but much later than their regular counterparts. The yield could probably have been increased by delayed harvest. Nebraska Red La Soda strain 10 performed quite well.

Texas Table 1. Yield, specific gravity, days to emergence, percent stand, vigor maturity, tuber type, and general tuber rating for 26 North Dakota advanced selections and three check varieties of potatoes grown and tested for earliness at Lubbock, Texas--1973

Selection or check variety	Yield cwt/A	Specific gravity	Days to em- ergence	Per- cent stand	Vigor ^{1/}	Matur- ity ^{2/}	Tuber type	General tuber rating ^{3/}
Viking	408	1.061	24	100	4.0	3.0	Oblong	3+
ND8913-4 Russ	362	1.070	23	100	3.0	4.0	Long	3+
ND8843-12 R	352	1.056	22	100	3.0	3.0	Round	4
ND8901-1 R	336	1.056	25	90	3.5	2.0	Round	3+
ND8891-2	331	1.056	24	100	3.5	3.0	Oblong	4
ND8893-6 R	328	1.063	25	90	3.0	3.0	Round	4
ND7196-18	319	1.069	23	90	4.0	3.0	Oblong	4
ND8767-10 R	312	1.067	25	100	3.0	3.0	Oblong	3
ND8914-8 Russ	307	1.054	23	100	3.5	3.5	Long	3
ND8916-7 Russ	303	1.057	25	100	3.0	3.0	Long	2
ND8947-2 Russ	296	1.053	25	100	4.0	2.0	Long	3-
ND8894-4 R	293	1.069	25	90	3.5	3.0	Oblong	4
ND9109-8 R	291	1.063	24	100	4.0	3.0	Round	5
ND8917-5 Russ	260	1.068	25	100	2.5	4.0	Long	4+
ND8894-11 R	260	1.056	26	100	4.0	3.0	Oblong	3
ND6634-2 R	251	1.062	25	70	2.5	3.0	Round	3+
ND8844-7 R	239	1.066	25	100	2.0	2.5	Oblong	3+
Norgold Russet	239	1.056	24	100	2.0	3.5	Oblong	3
ND8922-1 Russ	209	1.060	26	50	2.0	3.0	Oblong	3
ND8916-7 Russ	190	1.062	25	70	3.0	4.0	Long	2
Red La Soda	189	1.056	23	100	4.5	2.0	Round	3-
ND8976-7 R	164	1.060	25	90	1.0	4.0	Oblong	2-
ND7642-2 Russ	153	1.053	26	100	3.5	4.5	Long	3+
ND9004-1 Russ	146	1.065	25	100	3.5	1.0	Long	3
ND8200-4 R	146	1.066	24	100	3.5	3.0	Round	4
ND8494-3 Russ	138	1.053	25	100	2.0	4.5	Oblong	2+
ND8814-2 Russ	136	1.070	25	100	2.0	3.5	Oblong	3
ND7878-1	105	1.058	25	100	1.0	4.0	Round	3+
ND8914-5 Russ	82	1.063	25	80	1.0	4.0	Long	3
Average	246.3	1.057	24.6	93.8	2.9	3.2		3.3

^{1/} Number 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous.

^{2/} Number 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early.

^{3/} Number 1 = poor type to 5 = excellent type.

Texas Table 2. Total yield, yield of tubers 4-8 oz, yield of tubers 8 oz or over, specific gravity, chip color nonreconditioned, chip color reconditioned, vigor, and maturity of 55 potato varieties or selections grown at Lubbock, Texas--1973

Variety or selection	Total yield cwt/A	Yield cwt/A 4-8 oz	Yield cwt/A 8 oz +	Specific gravity	Chip color nonrecon	Chip color 1/ recon	Vigor ^{3/}	Maturity ^{4/}
Minn 3935	376.4	191.7	64.3	1.057	5	5	3	3
Red La Soda	367.8	192.8	99.5	1.052	5	4	5	2
Viking	364.7	78.6	234.6	1.058	5	3	4	4
Minn 3915	348.2	158.0	64.7	1.063	3	2	4	3
Reliance	345.7	159.5	99.1	1.057	5	5	4	4
B7147-8	345.4	134.0	86.0	1.065	3	3	4	3
B7196-20	343.1	125.1	97.6	1.067	6	2	4	3
La Rouge	341.5	125.8	148.3	1.061	4	3	4	3
Peconic	319.0	134.8	92.9	1.075	4	3	4	3
Minn 3866	318.7	120.8	73.6	1.063	4	3	3	3
Surchip	317.5	131.7	7.7	1.054	4	3	4	3
Red Norland	317.1	112.3	136.3	1.056	4	3	3	4
B7608-2	305.5	159.1	88.3	1.066	3	3	3	4
Monona	305.1	122.7	60.4	1.062	3	2	3	3
Bintje	299.3	0	0	1.051	3	3	4	3
Wauseon	298.5	132.4	82.9	1.063	4	3	4	3
B7188-56	296.2	74.3	136.7	1.063	5	3	3	4
FL 460	288.5	135.9	30.2	1.052	3	2	3	3
B7583-6	287.3	132.0	0	1.068	4	2	3	3
ND7196-18	287.3	104.5	35.2	1.064	3	1	4	4
Norgold Russet	284.2	92.9	94.5	1.054	4	3	4	4
Abnaki	283.1	100.7	42.2	1.060	5	3	5	3
Alamo	280.0	101.5	102.2	1.052	5	3	4	3
La Chipper	278.9	113.1	63.9	1.065	4	2	3	3
Norchip	269.2	116.2	91.0	1.067	3	1	4	3
B7196-4	266.0	68.2	84.0	1.062	4	3	3	4
L91-157	263.7	115.4	63.9	1.055	5	3	5	3
B7147-15	262.9	53.8	0	1.068	4	3	4	4
Seminole	261.8	83.6	91.4	1.075	5	3	4	4
Cherokee	257.1	101.1	23.2	1.063	5	5	3	4

(Continued)

Texas Table 2. Continued

Variety or selection	Total yield cwt/A	Yield cwt/A 4-8 oz	Yield cwt/A 8 oz +	Specific gravity	Chip color nonrecon	Chip color 1/ recon	Chip color 2/ recon	Vigor 3/	Maturity 4/
B7196-37	255.6	62.3	30.6	1.064	6	2	4	4	4
Katahdin	248.9	115.0	56.5	1.044	5	5	4	4	2
FL 96	248.9	126.2	83.6	1.069	4	2	4	4	4
L71-82	241.6	83.6	72.4	1.065	3	3	4	4	3
Hudson	239.3	114.6	63.9	1.062	4	3	4	4	2
ND7642-3	234.2	70.0	49.2	1.052	4	4	3	3	5
L71-110	232.7	126.6	43.0	1.053	6	4	4	4	3
Oromonte	230.8	67.4	111.1	1.069	5	5	4	4	3
FL 2	229.3	94.1	66.6	1.068	3	2	4	4	3
Anaka	226.3	100.0	70.9	1.065	4	3	3	3	4
Keswick	224.9	61.2	108.4	1.048	5	5	4	4	3
B7663-5	222.3	92.2	65.8	1.063	4	3	2	2	4
Raritan	213.7	88.7	45.7	1.067	4	4	4	4	3
B7610-1	213.0	82.5	0	1.061	4	3	4	4	3
Kennebec	208.3	52.3	51.9	1.063	4	3	5	3	3
Rushmore	204.0	57.7	105.7	1.061	4	3	3	3	4
B7146-9	203.3	69.7	71.6	1.064	3	2	2	2	4
FL 675	202.1	57.3	104.5	1.052	4	3	4	4	4
B7587-5	200.2	56.5	80.9	1.057	3	3	2	2	5
B 7655-2	183.2	63.5	45.7	1.063	3	2	3	3	3
Green Mountain	180.0	38.7	5.0	1.059	5	4	4	4	2
B7147-19	153.4	64.3	22.9	1.068	5	4	1	1	5
B7196-36	145.7	43.4	27.1	1.057	5	3	2	2	4
B7196-23	143.0	40.7	34.5	1.050	7	6	3	3	4
Cariboo	118.9	42.2	12.4	1.067	3	2	2	2	3
Mean	261.5	97.3	67.7	1.061	4.2	3.1	3.6	3.6	3.4
L.S.D. (.05)	56.0	37.7	42.7						

- 1/ Chipped directly out of storage (5 mo., 40° F); 1 = light to 10 = dark brown, PCI Color Scale.
2/ Chipped following reconditioning (4 weeks, 70° F); 1 = light to 10 = dark brown, PCI Color Scale.
3/ Number 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous.
4/ Number 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early.

Texas Table 3. Total yield, yield of tubers 4-8 oz, yield of tubers 8 oz or over, specific gravity, chip color nonreconditioned, chip color reconditioned, vigor and maturity of 57 potato varieties or selections grown at Hereford, Texas--1973

Variety or selection	Total yield cwt/A	Yield cwt/A 4-8 oz	Yield cwt/A 8 oz +	Specific gravity	Chip ^{1/} color nonrecon	Chip ^{2/} color recon	Vigor ^{3/}	Maturity ^{4/}
Red La Soda	514.6	160.3	279.9	1.066	7	5	3	3
Alamo	483.5	181.9	133.2	1.072	4	3	3	3
Norchip	482.1	195.9	197.5	1.070	4	1	4	3
L71-110	475.9	139.4	240.5	1.049	5	4	4	3
Viking	474.8	105.7	324.9	1.069	5	4	3	3
Bintje	459.6	116.9	9.7	1.067	4	4	4	3
Minn 3935	454.9	228.8	101.1	1.071	6	4	3	4
Surchip	439.8	230.4	74.3	1.067	4	3	2	4
Norgold Russet	434.9	196.3	167.3	1.063	6	4	3	4
La Rouge	432.1	162.2	161.1	1.066	5	5	3	3
ND7196-18	417.6	213.7	23.2	1.068	3	1	3	3
Cherokee	407.0	188.2	75.1	1.075	6	4	4	2
L91-157	403.8	122.7	183.5	1.060	5	4	3	2
Raritan	402.6	150.2	176.6	1.077	4	3	4	3
Oromonte	400.7	165.7	90.2	1.067	4	2	4	2
Peconic	398.9	86.0	190.5	1.081	4	3	3	3
ND7642-3	372.9	135.9	160.3	1.063	5	4	3	3
FL 96	372.0	149.8	152.9	1.075	5	3	3	3
Abnaki	369.8	139.8	148.7	1.069	6	4	3	4
Red Norland	369.0	121.6	151.0	1.062	4	3	3	4
Hudson	363.1	102.2	190.5	1.070	7	3	4	3
Keswick	362.8	214.5	65.8	1.069	5	4	3	4
La Chipper	361.7	125.5	175.0	1.069	5	5	3	3
Green Mountain	359.7	174.2	41.0	1.070	5	4	4	3
Monona	353.6	133.6	112.3	1.066	4	2	2	3
L71-82	350.0	101.1	168.0	1.070	4	3	4	2
Minn 3866	349.9	174.2	85.9	1.076	5	4	3	3
FL 460	348.9	126.6	127.4	1.067	4	2	3	3
B7196-20	327.2	131.3	84.4	1.075	4	2	3	3
Kennebec	317.5	63.9	151.0	1.067	5	3	3	4
B7610-1	311.3	122.7	76.3	1.078	3	1	5	2
Minn 3915	309.7	149.8	68.1	1.067	6	4	3	4
B7147-15	296.2	112.3	62.3	1.070	4	4	3	4
Continued								

Texas Table 3 Continued

Variety or selection	Total yield cwt/A	Yield cwt/A 4-8 oz	Yield cwt/A 8 oz +	Specific gravity	Chip ^{1/} color nonrecon	Chip ^{2/} color recon	Vigor ^{3/}	Maturity ^{4/}
Katahdin	294.2	126.3	82.5	1.054	4	4	4	3
Anaka	291.9	144.8	78.6	1.061	7	4	3	3
Cariboo	288.4	134.7	132.0	1.075	4	3	3	3
Reliance	287.0	73.2	125.5	1.061	5	4	3	4
MS709	275.4	46.5	101.1	1.069	6	5	3	3
FL 2	271.7	73.9	102.2	1.076	4	1	3	3
Seminole	270.5	27.5	82.5	1.083	4	3	3	4
Wauseon	241.2	99.9	110.7	1.068	5	3	3	3
B7583-6	223.7	98.3	111.5	1.079	4	3	3	3
Bake King	215.6	54.6	99.1	1.073	4	2	3	3
Rushmore	211.4	69.7	74.3	1.072	5	3	2	3
B7147-8	207.9	98.3	58.5	1.072	4	3	1	3
FL 675	205.2	7.7	62.3	1.060	5	4	3	3
B7196-37	179.7	93.3	48.8	1.067	4	3	3	4
B7655-2	171.2	67.4	91.8	1.070	5	5	2	3
B7188-56	155.6	104.5	20.9	1.065	5	4	2	5
B7663-5	111.1	63.9	25.9	1.074	7	4	2	4
B7147-9	99.5	46.1	26.7	1.071	4	3	1	5
B7196-23	91.0	33.7	44.9	1.068	5	4	1	4
B7147-19	83.7	58.5	13.6	1.066	5	3	1	5
B7587-5	80.9	51.5	14.7	1.063	4	2	1	4
B7608-2	79.0	46.5	23.2	1.067	5	2	1	5
B7196-4	68.9	50.7	0	1.057	5	3	1	5
B7196-36	66.2	33.7	0	1.071	3	3	1	4
Mean	306.1	81.4	115.2	1.069	4.7	3.3	2.8	3.4
L.S.D. (.05)	67.5	28.1	48.8					

^{1/} Chipped directly out of storage (5 months, 40° F), 1 = light to 10 = dark brown, PCI color scale.

^{2/} Chipped following reconditioning (4 weeks, 70° F), 1 = light to 10 = dark brown, PCI color scale.

^{3/} Number 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous.

^{4/} Number 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early.

Texas Table 4. Total yield, yield of tubers 4-8 oz, yield of tubers 8 oz or over, specific gravity, chip color nonreconditioned, chip color reconditioned, vigor and maturity of 41 entries grown at Plainview, Texas--1973

Entry	Total yield cwt/A	Yield cwt/A 4-8 oz	Yield cwt/A 8 oz +	Specific gravity	Chip color nonrecon	Chip color recon	Vigor ^{3/}	Maturity ^{4/}
Minn 3935	477.5	280.0	102.2	1.063	6	6	3	4
Red La Soda #10	467.8	192.1	182.4	1.062	5	4	3	3
Red Norland	466.5	182.0	225.7	1.058	3	3	3	4
Red La Soda	466.2	214.9	167.3	1.055	5	4	5	2
Viking	434.2	116.2	297.8	1.060	6	5	3	3
Red La Soda	427.9	131.7	237.4	1.053	5	4	4	2
Norchip	413.1	196.7	148.3	1.066	3	1	4	2
ND7196-18	406.6	231.6	48.0	1.065	3	1	3	3
Red La Soda	399.3	134.4	209.1	1.053	6	4	4	2
Viking	392.0	116.6	255.6	1.062	5	4	3	3
Norgold Russet	385.3	206.0	79.4	1.064	5	4	3	4
Minn 3866	364.0	175.8	95.3	1.078	8	4	3	3
Hudson	363.2	202.1	103.4	1.065	5	2	4	3
Rushmore	357.9	123.9	192.1	1.064	7	3	3	3
B7147-15	356.2	178.1	5.8	1.069	6	4	4	3
B7196-20	346.6	125.8	157.6	1.072	5	2	4	3
Norgold Russet	343.9	140.2	157.6	1.062	6	5	3	4
Cherokee	341.1	173.1	90.2	1.066	5	4	3	3
Minn 3915	327.5	157.2	89.8	1.062	7	4	3	3
Anaka	322.2	130.1	151.8	1.068	6	5	2	4
L71-110	311.3	115.4	127.8	1.052	5	5	4	3
B7196-4	310.6	156.4	34.5	1.070	7	3	3	4
B7196-37	309.7	121.6	62.3	1.068	4	3	3	4
L91-157	294.3	178.9	60.4	1.055	6	3	5	2
B7147-8	293.1	170.4	62.3	1.072	5	5	3	3
ND7642-3	290.4	104.5	104.5	1.062	4	4	3	4
La Chipper	288.1	97.2	142.1	1.068	4	2	3	3
B7188-56	276.5	113.1	90.2	1.069	6	2	3	4
B7610-1	272.3	134.0	58.1	1.073	3	3	5	2
Red La Soda "x free"	272.0	139.1	21.7	1.057	6	6	4	1
B7655-2	269.9	117.7	111.9	1.070	5	3	3	3
B7583-6	266.1	143.3	64.3	1.080	3	2	4	3
B7196-36	262.6	122.0	104.9	1.076	4	4	2	3

Continued

Texas Table 4 Continued

Entry	Total yield cwt/A	Yield cwt/A 4-8 oz	Yield cwt/A 8 oz +	Specific gravity	Chip ^{1/} color nonrecon	Chip ^{2/} color recon	Vigor ^{3/}	Maturity ^{4/}
B7663-5	234.7	129.3	70.9	1.072	4	3	2	3
B7196-23	222.0	82.9	106.5	1.062	6	5	3	4
Norgold Russet (late)	220.8	53.1	51.5	1.051	6	5	3	1
L71-82	220.7	134.0	42.6	1.065	3	3	5	2
B7608-2	213.0	127.0	19.4	1.072	5	4	2	3
B7587-5	208.0	140.2	18.6	1.066	5	3	1	3
B7147-9	152.2	65.8	12.4	1.065	4	3	2	3
B7147-19	145.2	67.4	35.2	1.071	6	6	2	5
Mean	321.8	144.4	109.7	1.065	5.1	3.7	3.2	3.1
L.S.D. (.05)	44.4	44.2	11.1					

^{1/} Chipped directly out of storage (5 months, 40° F), 1 = light to 10 = dark brown, PCI color scale.

^{2/} Chipped following reconditioning (4 weeks, 70° F), 1 = light to 10 = dark brown, PCI color scale.

^{3/} Number 1 = poor or weak, 2 = fair, 3 = medium, 4 = vigorous, 5 = very vigorous.

^{4/} Number 1 = very late, 2 = late, 3 = medium, 4 = early, 5 = very early.

Texas Table 5. Total yield, yield of tubers under two inches, yield of tubers over two inches, specific gravity and general tuber rating of 41 entries grown at Welch, Texas--1973

Variety or selection	Total yield cwt/A	Yield under 2" cwt/A	Yield over 2" cwt/A	Specific gravity	General tuber rating ^{1/}
Red La Soda	376.4	54.0	322.3	1.053	3
B7583-6	364.2	115.0	249.2	1.075	3
Red La Soda	364.2	106.3	257.9	1.062	3
Red La Soda	362.4	74.9	287.5	1.060	3
Hi Plains	287.5	146.4	141.1	1.071	2
B7147-15	285.8	271.8	13.9	1.077	1
Minn 3866	271.8	160.3	111.5	1.077	2
Norchip	257.9	81.9	176.0	1.072	3
Norgold Russet (late)	254.4	125.5	128.9	1.068	3
Norgold Russet	252.7	153.3	99.3	1.069	3
BR7044-2	250.9	146.4	104.5	1.078	3
B7196-36	224.8	224.8	0	1.072	1
Viking	221.3	48.8	172.5	1.066	2
Norgold Russet	217.8	128.9	88.9	1.064	3
B7196-20	216.1	99.3	116.7	1.075	3
ND7642-3	214.3	193.4	20.9	1.068	3
B7146-8	210.8	118.5	92.4	1.068	3
BR6863-8E	200.4	62.7	137.7	1.079	1
Rushmore	196.9	174.2	22.7	1.072	1
L71-110	191.7	48.8	142.9	1.064	2
Alamo	188.2	61.0	127.2	1.064	2
L71-82	179.5	111.5	68.0	1.067	1
B7196-4	176.0	155.1	20.9	1.068	1
B7196-37	170.8	170.8	0	1.060	3
B7587-5	169.0	151.6	17.7	1.060	1
B7147-9	167.3	149.9	17.4	1.064	1
Peconic	165.5	70.0	95.8	1.079	1
B7663-5	155.1	139.4	15.7	1.059	1
Anaka	153.3	135.9	17.4	1.067	1
B7608-2	151.6	125.5	26.1	1.065	1
B7610-1	151.6	43.6	108.0	1.076	3
Hudson	142.9	59.2	83.6	1.076	1
ND7196-13	141.1	109.8	31.4	1.068	1
B7196-23	135.9	66.2	69.7	1.060	1
B7188-56	120.2	115.0	5.2	1.070	1
B7147-19	106.3	55.8	50.5	1.064	1
L91-157	102.8	68.0	34.8	1.070	1
La Chipper	97.6	55.8	41.8	1.066	1
B7655-2	71.4	61.0	10.5	1.065	1
BR7066-1	66.2	12.2	54.0	1.067	1
BR7091-1	64.5	26.1	38.3	1.060	1
Mean	197.5	109.2	88.3	1.068	1.8
L.S.D. (.05)	103.7	76.5	89.8		

^{1/} Number 1 = poor to 3 = excellent.

B. A. Perry, R. E. Webb and M. C. Fuqua

Screening and Evaluation of Potato
Varieties and Breeding Lines

Yield Tests. Forty-two breeding lines and varieties were evaluated, with plantings at College Station and Munday. A randomized and replicated planting was made at both locations where planting stocks were ample; otherwise the entries were grown in a single replication of ten or more hills. The commercial varieties used for comparison were Norgold Russet, Kennebec and Red LaSoda. In the Munday planting the commercial variety Kennebec gave a better yield than any of the white breeding selections and Norgold Russet gave a better yield than any of the russet breeding lines. However, several breeding lines had a better color than Norgold Russet. Also, B7807-2 had a higher specific gravity than Norgold Russet. Several of the white breeding lines gave a higher specific gravity than the check variety, which may indicate superior processing potential. The amount of water applied to the Munday location was 22 inches, including rainfall and irrigation between March 6 and June 19. The test was harvested on June 25, 1973. Nine selections were made from the planting, most of these were white skinned varieties with only a few russet types worthy of continuing in Texas. The Russet selection, B7807-2, was outstanding at both College Station and Munday and could be considered for early release. Yields and other data are reported in the Texas tables.

Texas Table 1. Yield Test, Munday, 1973

Variety	Yield per acre in pounds		
	> 6 oz.	6-8 oz.	< 8 oz.
Kennebec	13,388	1,942	2,195
Norgold Russet	12,221	2,289	0
B7807-2	10,383	4,170	736
B7678-17	9,974	2,534	370
B7655-2	11,528	1,145	0
B7583-6	12,264	0	0
B6815-14	10,278	572	180
B7583-19	8,136	1,962	428
B7781-13	7,346	458	0
B6548-1	6,522	1,008	0
B6759-3	5,886	1,471	0
B6761-11	7,335	0	0
B7637-9	4,905	490	0
B6775-4	3,011	0	0
B7610-1	1,717	0	0

Planted: 3-6-73

Harvested: 6-25-73

Fertilizer: 140#/A 16-20-6 + 200#/A Ammonium sulfate;
sidedressed with 300#/A Ammonium sulfate.

Texas Table 2. Evaluation Test, College Station, 1973

Pedigree or Variety	<u>Ratings</u>				Overall ^{5/} Rating
	Sp. Gravity ^{1/}	Maturity ^{2/}	Wind & Heat ^{3/}	Disease ^{4/}	
LaSoda	30	3	1	2	2
Kennebec	50	4	2	3	2
Norgold Russet	69	3	2	2	2
B6548-1	67	3	2	3	2
B6775-4	-	4	3	1	2
B7781-13	-	2	3	4	3
B6759-3	-	2	3	4	3
B6815-14	-	2	3	4	3
B7583-6	60	3	3	3	3
B7583-19	60	3	2	2	> 3
B7610-1	58	5	1	1	2
B7637-9	-	3	2	2	3
B6761-11	60	3	2	2	2
B7655-2	-	3	2	3	2
B7678-17	-	2	2	3	2
B7807-2	72	3	2	3	2

Planted: 4-5-73 Harvested: 7-24-73

^{1/} Determined with potato hydrometer, 1.0 omitted.

^{2/} Maturity rated 1 to 5: 1 = early; 5 = late.

^{3/} Wind and heat rated 1 to 5: 1 = no burn; 5 = severe burn.

^{4/} Disease damage rated 1 to 5: 1 = apparently free; 5 = severe damage

^{5/} Overall rating based on 1 to 5: 1 = excellent variety; 5 = poor, not acceptable.

VERMONT

W. R. Kelly, S. C. Wiggans, R. N. Jensen, and H. J. Murphy

During 1973 three potato variety trials were conducted in Vermont by the Plant Pest Control Division of the Vermont Department of Agriculture, the Plant and Soil Science Department of the University of Vermont, and the Plant and Soil Sciences Department of the University of Maine. These trials were located at Rutland, Wolcott, and South Burlington. There were five replicates in a randomized block at each location. Seedpieces of all varieties were planted by hand. They were nine inches apart for all varieties. These plantings were part of the tri-state cooperative variety trial of the National Potato Breeding Program.

The plots at Rutland were planted on May 30, killed September 9, and harvested September 26. Fertilizer was applied at the rate of 200-400-400 per acre. Potatoes were grown in a medium loamy soil. There was adequate moisture. Weed control was good initially; however, quack grass "took over" late in the season. Early season temperatures were cool with hot weather prevailing in August and September (Table 1).

The plots at Wolcott were planted June 5, killed August 29, and harvested September 13. Fertilizer was applied at the rate of 136-204-204 per acre. Potatoes were grown in a medium loamy sand. Moisture was high in June and early July and adequate the rest of the season. The wet soil hindered planting and early growth. The season was short and yields were low (Table 2).

The plots in South Burlington were planted May 29 and harvested September 26. Fertilizer was broadcast 100-100-100 and sidedressed 60-60-60 per acre. The potatoes were planted in a light sandy soil. Only one irrigation was necessary since adequate moisture was available the rest of the year. Yields were good (Table 3).

Chip color indices for potato varieties grown in all three Vermont locations in 1973 are given in Table 4.

Cascade yielded very well in all three locations. It appears to be adapted to Vermont conditions and several growers are interested in it. Iopride yielded well at all three locations and chip color was acceptable. Cariboo had a good appearance and good chip color; however, it did not yield well at any location. Line BR6532-4 yielded well in South Burlington. Growing conditions were so erratic in Vermont in 1973 that further conclusions cannot be drawn.

Table 1. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 17 potato varieties grown at Rutland, Vermont - 1973.

Variety ^{1/}	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids
Cariboo	258cd	92.4	59.0	1.082ab	20.64
Cascade	372ab	96.0	82.9	1.066e	17.26
Cobbler	279cd	94.2	73.6	1.070cde	18.10
Iopride	333abc	96.3	82.1	1.064e	16.84
Katahdin	287cd	94.5	81.8	1.068de	17.68
Kennebec	282cd	95.3	81.8	1.063e	16.63
Penn-71	280cd	95.1	83.6	1.069cde	17.89
Shurchip	267cd	94.9	71.0	1.066e	17.26
York	290cd	94.3	77.9	1.076bc	19.37
B6103-1	393a	96.1	83.3	1.069cde	17.89
BR6532-4	230d	92.8	81.7	1.074cd	18.95
BR6456-1	280cd	95.2	72.9	1.066e	17.26
BR6626-5	292cd	93.7	81.2	1.068de	17.68
BR6862-2	281cd	93.5	77.3	1.068de	17.68
BR6863-8	332abc	93.9	72.6	1.081ab	20.43
BR6864-1	301bcd	91.8	66.0	1.069cde	17.89
F6208	324abc	95.6	82.0	1.083a	20.85

^{1/} Planted - May 30; killed - September 9; harvested - September 26, 1973.

Seedpieces of all varieties spaced 9 inches.

Fertilizer: 200-400-400

Table 2. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 17 potato varieties grown at Wolcott, Vermont - 1973.

Variety ^{1/}	Yield above 1½ inches Gwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids
Cariboo	158ab	90.2	55.2	1.088ab	21.90
Cascade	174ab	96.4	78.7	1.076de	19.37
Cobbler	161ab	93.7	66.2	1.077de	19.58
Iopride	179ab	96.0	71.7	1.075e	19.16
Katahdin	164ab	95.9	67.5	1.077de	19.58
Kennebec	187ab	95.1	70.8	1.080cde	20.21
Penn-71	153ab	95.5	74.5	1.077de	19.58
Shurchip	184ab	94.2	67.5	1.075de	19.16
York	140ab	91.3	63.3	1.087ab	21.69
B6987-1	130c	89.2	57.7	1.086abc	21.48
BR6456-1	134ab	92.9	66.5	1.077de	19.58
BR6626-5	148ab	96.4	72.4	1.075e	19.16
BR6862-2	150ab	95.4	72.9	1.084abc	21.06
BR7085-1	174ab	92.5	54.9	1.089a	22.11
CA28-2	178ab	90.1	42.5	1.082bcd	20.64
CA61-3	137ab	93.1	69.3	1.087ab	21.69
F6208	203a	94.4	70.9	1.084abc	21.06

^{1/} Planted - June 5; killed - August 29; harvested - September 13, 1973.

Seedpieces of all varieties spaced 9 inches.

Fertilizer: 136-204-204.

Table 3. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 20 potato varieties grown at South Burlington, Vermont - 1973.

Variety ^{1/}	Yield above 1½ inches Cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids
Bake King	372c-f	93.9	64.0	1.078a	19.79
Cariboo	162j	71.6	27.9	1.073a-d	18.74
Cascade	438abc	95.6	75.3	1.071b-e	18.32
Cobbler	318gh	93.4	54.7	1.071b-e	18.32
Green Mountain	444ab	95.6	76.5	1.077a	19.58
Iopride	384b-f	97.1	66.1	1.061h	16.21
Katahdin	428abc	97.2	73.8	1.063fgh	16.63
Kennebec	441abc	96.2	76.0	1.068d-g	17.68
Penn-71	352def	97.9	60.6	1.069def	17.89
Shurchip	391b-e	94.8	67.3	1.063fgh	16.63
Targhee	260hi	90.0	44.7	1.071b-e	18.32
York	244i	92.1	41.9	1.068d-g	17.68
BR6532-4	473a	96.8	81.4	1.068d-g	17.68
BR6626-5	351def	92.8	60.4	1.070cde	18.10
BR6820-26	332fg	91.5	51.1	1.062gh	16.42
BR6863-3	344def	95.6	59.3	1.075abc	19.16
BR6864-1	407a-d	90.9	70.0	1.066e-h	17.26
BR7103-2	408a-d	97.0	70.2	1.076ab	19.37
BR7104-10	405a-d	94.9	69.7	1.068d-g	17.68
CA60-24	346def	95.7	59.5	1.068d-g	17.68

^{1/} Planted - May 29; harvested - September 26, 1973.

Seedpieces of all varieties spaced 9 inches apart.

Fertilizer for all varieties: 100-100-100 broadcasted; 60-60-60 sidedressed.

Table 4. Chip color indices for potato varieties grown in Vermont locations - 1973.^{1/}

Variety	South Burlington	Wolcott	Rutland
Bake King	9.1ab		
Cariboo	5.7h	6.3e	5.2fg
Cascade	9.0ab	9.8a	7.7ab
Cobbler	7.7def	7.9bcd	7.6abc
Green Mountain	9.8a		
Iopride	7.9def	8.4abc	7.0a-e
Katahdin	8.7a-d	8.4abc	6.5cd
Kennebec	8.1b-e	7.6b-e	7.0a-d
Penn-71	5.4h	7.6b-e	5.1fg
Shurchip	8.0c-f	7.4b-e	6.5cd
Targhee	9.8a		
York	5.4h	7.3cde	6.8b-e
BR6532-4	9.2ab		
B6987-1		6.4e	8.0a
BR6456-1		9.4a	7.5abc
BR6626-5	9.5a	9.3a	7.8ab
BR6820-26	9.1ab		
BR6862-2		7.7b-e	6.1def
BR6863-3	5.3h		
BR6864-1	6.2gh		
BR7085-1		7.9bcd	4.9g
BR7103-2	6.9fg		
BR7104-10	7.6ef		
CA28-2		8.8ab	7.2abc
CA60-24	7.9def		
CA61-3		6.8de	5.9efg
F6208		8.6abc	7.3abc

^{1/} Chips with lower indices are lighter in color.

VIRGINIA

Boyett Graves

Variety and Seedling Evaluations

Procedure. Selections in the advanced trial were grown in 5-replicate plots, and selections in the observational trial were grown in 3- or 4-replicate plots. In addition to these, other seedlings were grown in 20-hill rows for initial screening observations at the Painter, Virginia, location. Fertilizer was band placed at 1000 lbs. of 10-10-10 per acre. Phorate (Thimet) insecticide was applied at planting at the rate of 2.5 lbs. active ingredient per acre. The plots received irrigation water on June 6 and June 12.

Seed was cut, treated, and hand planted March 18 and 19. Harvests were July 5 for the 20-hill plots and July 9 for all replicated plots. Samples were removed on the day of harvest and shipped to Wise Foods, Berwick, Pennsylvania, for chipping evaluations. Specific gravity determinations were made 2 days after harvest.

Tables 1, 2, 3, and 4 show ratings and evaluations of several characteristics of these selections. The "speckle leaf" ratings are an indication of the severity of air pollution damage. Ratings were made on May 18 and May 29. They should not be interpreted to be conclusive of the resistance of these selections to air oxidants since no high oxidant levels were recorded on monitors prior to the ratings and since some of the same clones have been rated quite differently in other years.

Among the seedlings grown in the two replicated trials B6495-20, B6516-28, B6516-15, B6951-5, B6516-20, and B7154-10 have shown some promise, although some are lacking in dry matter and/or chipping desirability.

Virginia Table 1. Advanced Trial. Yield, specific gravity, chip color, plant vigor, pollution resistance, and tuber appearance ratings of potato selections. Eastern Shore of Va., 1973.

	Yield (cwt/acre)			Specific Gravity	Chip Color 1/2			Plant Vigor 2/	Speckle Leaf 3/		Preharvest Tuber	
	1 7/8 in. 1-1 7/8 Total				At Harvest	7 Weekly Cookings	Sprouts		Rating 4/			
	Minimum	Inch	Yield									
Hudson	279	15	294	1.0658	4	6.0	1.0	2.0	No	1.5		
Pungo	251	17	268	1.0657	4	5.2	1.0	1.5	Yes	2.0		
B7031-N2	239	24	263	1.0580	5	5.2	1.0	1.0	Yes	3.0		
Kennebec	231	23	254	1.0611	2	4.4	1.5	2.0	Few	3.0		
68C5-18	230	39	269	1.0631	2	4.4	1.0	1.0	No	3.5		
Chieftan	222	41	263	1.0545	5	6.4	1.5	1.0	No	2.0		
B6495-20	218	29	247	1.0846	1	4.8	1.0	2.5	No	2.0		
64C2-3	209	30	239	1.0523	2	3.2	1.0	1.0	No	2.5		
Norchip	207	28	235	1.0690	1	2.8	1.5	2.0	No	2.0		
B6973-N4	207	42	249	1.0491			1.5	1.5	Yes	2.5		
B7154-10	205	25	230	1.0438	1	2.2	1.5	1.5	No	2.5		
B6987-56	196	32	228	1.0719	1	2.6	2.0	2.5	No	2.0		
B5141-6	192	28	220	1.0815			2.0	3.0	Yes	3.0		
B6516-15	188	17	205	1.0666	2	2.8	1.0	2.0	No	2.5		
Abnaki	188	19	207	1.0544	4	5.0	1.5	2.0	Few	2.5		
Wauseon	183	29	212	1.0589	2	3.0	2.0	3.5	No	2.0		
B7200-26	179	19	198	1.0537	2	3.0	1.0	1.0	No	2.0		
B6516-28	172	13	185	1.0708	1	4.4	1.5	1.0	No	3.5		
B6516-20	171	28	199	1.0815	2	4.4	1.0	1.0	Yes	3.5		
B6987-57	171	12	183	1.0664	1	1.8	1.5	1.0	No	3.0		
Penn 71	164	21	185	1.0610	2	2.2	1.5	1.5	No	2.5		
Superior	160	15	175	1.0644	1	2.8	2.5	2.5	No	2.0		
LaChipper	157	41	198	1.0602	1	3.2	2.0	3.5	No	3.0		
B6955-33	149	30	179	1.0643	2	2.4	2.5	1.5	No	2.0		
B6955-35	140	30	170	1.0654	1	3.2	2.0	1.5	No	2.0		
Alamo	135	28	163	1.0544	5	5.8	3.0	2.0	No	3.0		
B6987-54	125	36	161	1.0653			3.0	4.0	Yes	2.5		
B6955-25	124	35	159	1.0566			2.0	2.5	Yes	4.0		
B6597-N3	96	21	117	1.0642			3.0	4.0	No	2.0		
Katahdin	92	14	106	1.0462			2.5	1.5	No	2.0		

$\frac{1}{2}$, $\frac{2}{2}$, $\frac{3}{2}$, $\frac{4}{2}$ -- Footnotes at end of Virginia Table 3.

Virginia Table 2. Observational Trial. Yield, specific gravity, chip color, pollution resistance, and tuber appearance of potato selections. Eastern Shore of Va., 1973.

	Yield (cwt/acre)			%	Sp. Gravity at Harvest	Chip Color Rating 1/			Speckle Leaf Rating 3/	Preharvest Sprouting	Tuber Rating 4/
	1 7/8 in. 1-1 7/8					At Harvest	Mean 7 Weekly Cookings	Rating 3/			
	Minimum	Inch	Total								
B6987-29	224	28	252	89	1.0656	2	3.0	4.0			2.5
B7154-6	216	41	257	84	1.0509	3	5.2	2.0	Yes		2.0
B7755-1	213	15	228	93	1.0631			3.5			1.5
B6987-2	209	28	237	88	1.0591			2.0	Yes		2.5
B7158-35	196	53	249	79	1.0650			2.5			2.5
B6951-5	196	9	205	96	1.0615	1	2.6	2.0			1.0
B7155-56	189	48	237	80	1.0584	3	3.8	2.0			2.0
B7151-4	188	28	216	87	1.0702			1.0	Yes		3.0
B7802-2	180	24	204	88	1.0492			1.5	Yes		1.5
B6934-12	180	21	201	90	1.0628			3.0			1.5
B7152-1	178	25	203	88	1.0604	1	2.4	1.5			2.5
B6969-2	177	19	196	90	1.0569	3	2.8	3.0			2.5
B7148-1	174	17	191	91	1.0561	1	3.0	2.0			3.0
BR7051-3	159	27	186	86	1.0741	2	2.0	3.5			2.0
B7165-10	158	20	153	87	1.0599			1.5			3.0
B7805-1	156	24	180	87	1.0553	3	6.2	2.0			1.5
B7148-4	156	11	167	93	1.0522	3	4.2	2.0			2.5
B7154-8	146	40	186	79	1.0572			2.0			2.5
B7141-1	143	21	164	87	1.0746			2.0	Few		1.5
B7744-4	133	21	154	86	1.0464			3.5			2.0
BR7106-5	133	20	153	87	1.0754			3.0			1.5
B7167-2	126	36	152	78	1.0661			2.5	Yes		2.5
B6987-22	110	46	156	71	1.0632			4.5	Yes		3.5
B7152-3	72	44	116	62	1.0637			2.5			2.5
B6969-1	69	19	88	80	1.0592			3.0			2.5

1/, 2/, 3', 4' -- Footnotes at end of Virginia Table 3.

Virginia Table 3. Long tubered selections grown in replicated plots. Eastern Shore of Virginia, 1973.

	Yield cwt/acre	Specific Gravity at Harvest	Sprouted at Harvest	Plant 2/		Speckle Leaf 3/		Tuber 4/		Remarks
				Vigor	Rating	Leaf	Rating	Rating	Rating	
B7152-12	172	1.0619	No	1.5	1.5	1.0	1.0	1.5	1.5	All round potatoes.
BR7089-1	166	1.0600	Yes	2.0	2.0	2.0	2.0	2.5	2.5	Mostly long, very late maturity.
Nor. Russet	146	1.0562	No	1.5	1.5	2.5	2.5	2.0	2.0	Mostly long, few oblong, size fairly small.
	133	1.0567	Yes	2.5	2.5	3.5	3.5	2.0	2.0	All long type, size small, fairly early maturity.
B7680-3	124	1.0564	No	3.0	3.0	2.0	2.0	2.5	2.5	Very small, mostly long type.
B7673-3	94	1.0620	No	2.5	2.5	4.0	4.0	2.0	2.0	Mostly round, mostly small size.
B7147-36	85	1.0605	No	3.0	3.0					
B7573-3										

Virginia Table 4. Notes made on selected seedlings grown in 20 hill plots. Eastern Shore of Va., 1973.

	Specific Gravity	Speckle Leaf 3/	Chip Color 1/		Mean 7 Weekly Cookings	Remarks
			At Harvest			
Long tubered, white skinned						
B7165-2	1.0612	2.0	1.0	2.4	2.4	Mostly oblong, shallow eyes, very smooth shape, good yield
B7669-2	1.0470	2.5	2.0	5.6	5.6	Mostly long, shallow eyes, light net skin, good yield
B7694-1	1.0555	1.5	1.0	3.0	3.0	Blocky-oblong shape, smooth, good yield
Long tubered, russet skinned						
B7147-8	1.0669	1.5	1.0	2.8	2.8	Long shape, heavy russet, good yield
B7160-4	1.0612	1.5	3.0	3.6	3.6	Long smooth shape, medium yield
B7679-9	1.0590	1.5	3.0	5.8	5.8	Excellent long shape, excellent yield
Round tubered, white skinned						
B7621-2	1.0589	2.5	1.0	3.0	3.0	Very fine shape, med. yield
B7768-4	1.0678	2.5	2.0	4.4	4.4	Excellent shape, good yield, occasional heat sprout
B7139-4	1.0620	1.0	2.0	2.8	2.8	Good shape, excellent size uniformity, heavy yield, med. deep eyes
B7152-14	1.0450	1.0	3.0	3.0	3.0	Good shape, smooth, shallow eyes, good yield
B7252-3	1.0500	2.0	2.0	3.4	3.4	Excellent shape, med. yield
B7590-6	1.0510	1.5	2.0	2.8	2.8	Fair shape, heavy set, med. yield, late size
B7597-1	1.0522	1.5	1.0	3.4	3.4	Excellent shape, med. set, good yield
B7617-1	1.0600	2.5	2.0	6.0	6.0	Slightly flattened, very smooth, good yield
B7620-4	1.0590	3.0	5.0	6.4	6.4	Good shape, uniform size, good yield
B7632-3	1.0546	1.0	1.0	4.0	4.0	Excellent shape, rough skinned, good yield
B7649-5	1.0501	1.5	1.0	2.4	2.4	Excellent shape, very large, early size, excellent yield
B7698-1	1.0568	1.0	2.0	2.0	2.0	Good shape, mod. yield
B7772-5	1.0576	1.0	1.0	3.4	3.4	Fair shape, high yield, occasional heat sprout
Pa7ZT-23	1.0589	1.0	2.0	6.0	6.0	Good shape, size and yield
F9-31	1.0665	1.0	1.0	2.4	2.4	Fair shape, excellent yield
Pa7SW-11	1.0537	3.0	1.0	2.4	2.4	

Footnotes for Tables 1, 2, 3 and 4.

- 1/ Chip color: 1 - 2 = Very light color, very desirable
3 - 4 = Moderately light color, no marketing problem
5 = Brownish color, barely marketable
6 - 10 = Brown to black color, unmarketable
- 2/ Plant vigor ratings: 1.0 = Very vigorous and fast growing plants
5.0 = Weak, spindly, slow growing plants
- 3/ Speckle leaf rating (air pollution damage?):
1.0 = No speckling or only occasional specks on leaves
4.0 = Most leaves including terminals showing severe speckling
5.0 = Plants dead or very near dead
- 4/ Tuber ratings: Includes shape, smoothness of shape and skin, eye depth,
feathering, etc.
1.0 = Very nice appearance
5.0 = Very poor appearance

WASHINGTON

William G. Hoyman

July and September harvest trials were conducted at the Irrigated Agriculture Research and Extension Center, Prosser, Washington. N, P and K were broadcast previous to plowing at 160, 40 and 80 pounds per acre, respectively. A starter fertilizer containing 53, 15 and 30 pounds per acre of these respective elements was banded at planting. Also banded at planting were three pounds per acre of the active ingredient in disulfoton. Demeton spray was used for aphid control.

Each selection was randomized four times with 15 hills per replicate. The $1\frac{1}{2}$ to 2-ounce cut seed was treated with 5 percent captan dust at the rate of $1\frac{1}{2}$ pounds per 100 pounds of seed. Seed was spaced 12 inches within and 38 inches between rows.

July Harvest Trial (Table 1). Three early yielding russet selections were compared with Norgold Russet. Yield differences were not significant but there was a difference in the appearance of the russet tubers. Selection W284-1 has a uniform type tuber with very attractive russet skin. Some pear-shaped tubers were present in W330-1, and W377-2 produced too many small tubers but it did have an attractive russet skin. Degree of russetting was not consistent on Norgold Russet tubers and the tuber type was too variable. This variety has a tendency to produce round tubers and 1.4 percent of the total yield was hollow. All selections were resistant to Streptomyces scabies, but they varied in their reaction to Verticillium albo-atrum. Specific gravities and chip colors are shown in Table 1.

September Harvest Trial (Table 2). The performance of 16 selections was compared with Russet Burbank. Russet selection WC316-7 was the highest yielder and was resistant to S. scabies, V. albo-atrum and Phytophthora infestans. It had a slight amount of tuber skin cracking. The CA (Campbell Soup) selections were susceptible to the strain or strains of S. scabies at Prosser.

Comparison of W284-1 and Norgold Russet (Table 3). Norgold Russet is grown in Washington as an early fresh-market variety. It can be harvested four to six weeks before Russet Burbank. Its inherent susceptibility to hollow tubers is a peril to its production. Under some conditions the tubers are not oblong but have a tendency to be somewhat round, and the degree of russetting may vary.

Selection W284-1 has a comparable yield and specific gravity but is superior in uniformity of tuber type and attractiveness of russet skin. Hollow tubers have seldom been found during the six-year period it has been grown at Prosser.

WC Russet Selections. Cooperative research with James Twomey, San Luis Valley Experiment Station, Center, Colorado, has resulted in the selection of some russets that are adapted to certain areas of Colorado, California, New Mexico and Arizona. Among the russet selections are WC230-14, WC285-18, WC285-83, WC285-141, WC285-146 and WC325-1. Seed of all are being increased and some will be grown commercially in 1974.

Washington Table 1. July harvest trial of russets, Prosser, Washington. Planted March 22 and harvested July 25, 1973.

Selection or variety	Cwt. per acre		Hollow	Percent tubers scabbed	Verti- cillium wilt	Specific gravity	Chip ^{3/} color	Tuber charac- teristics
	Total yields	No. 2's						
W284-1	679	51		2	3.00	1.079	5	Oblong, Uniform
W330-1	654	90		2	2.75	1.081	5	Oblong
W377-2	661	69		3	0.50	1.090	6	Oblong
Norgold Russet	662	46	9	1	4.25	1.076	7	Oblong

^{1/} Includes tubers from slight to severe scab.

^{2/} Reading taken July 23.

^{3/} At harvest.

Washington Table 2. September harvest trial, Prosser, Washington. Planted March 29 and harvested September 28, 1973.

Selection	Cwt. per acre		No.	Percent tubers		Verti- cillium		Late blight	Specific gravity	Chip color	Tuber characteristics
	Total	2's		Scab	Hollow	7/23	8/8				
B7678-17	422	27	2.5	0.0	0.0	1.25	4.25	+	1.088	6	R, round
BR7085-1	413	37	21.2	0.0	0.0	4.00	5.00	-	1.097	8	W, oblong
CA23-6	348	11	35.4	1.6	0.0	2.00	4.00	+	1.094	7	W, oblong, DSE, Cr
CA25-6	358	27	19.3	0.0	0.0	4.75	5.00	-	1.086	6	W, round
CA26-2	550	31	17.3	0.0	0.0	1.00	3.00	-	1.076	10	W, round, DSE
CA40-7	376	27	16.7	0.0	0.0	2.75	5.00	-	1.093	7	W, round
W280-11	422	62	0.0	0.3	0.3	0.75	1.50	+	1.090	9	Sl R, deep eyes
W326-1	440	22	4.1	0.3	0.3	0.75	3.75	-	1.086	8	R, oblong, flat, Cr
W347-1	321	18	0.0	0.0	0.0	1.00	2.75	-	1.098	5	R, oblong
W377-2	422	66	1.0	0.0	0.0	0.00	1.75	+	1.095	6	R, long, small
WC285-9	238	25	0.0	0.0	0.0	4.50	5.00	-	1.079	8	R, oblong
WC285-141	367	15	6.9	0.3	0.3	2.00	3.75	-	1.086	8	R, oblong, flat
WC304-4	440	17	21.1	0.0	0.0	2.75	4.50	-	1.080	8	Sl R, oblong, flat
WC314-2	541	21	0.0	0.0	0.0	1.00	3.00	+	1.093	8	R, oblong, nice
WC316-7	779	41	0.0	0.3	0.3	0.00	0.25	-	1.087	6	R, oblong, Cr
WC345-15	633	23	12.1	3.2	3.2	0.00	0.25	-	1.086	7	R, oblong, flat
Russet											
Burbank	468	76	0.0	0.0	0.0	1.25	2.75	+	1.087	8	R, long

1/ Tubers with slight to severe scab included

2/ Wilt readings taken at two dates indicated

3/ Detached leaf method with common strain

4/ Chipped at harvest

5/ R = russet, W = white, DSE = deep seed end, Cr = cracks

Washington Table 3. Comparison of W284-1 and Norgold Russet.

Year	W284-1		Norgold Russet	
	Total ^{1/} yield	Specific gravity	Total ^{1/} yield	Specific gravity
1970	773	1.072	646	1.075
1971	529	1.069	385	1.071
1972	464	1.082	499	1.075
Average	588	1.074	510	1.073

^{1/} Cwt. per acre

Reaction to Meloidogyne hapla (Table 4). Nineteen selections and two varieties were replicated twice in field H15 that is infested with the root knot nematode. No insecticide was applied at planting or during the summer. Twenty-five tubers of each cultivar were chosen at random and examined for external tuber galls and internal symptoms. Only five cultivars had tuber galls whereas 16 had internal tuber symptoms. Nooksack and four selections were free of all symptoms. Russet Burbank had no tuber galls but 15 of the 25 tubers had internal symptoms.

Washington Table 4. Reaction to Meloidogyne hapla.

Selection or Variety	Number of tubers			
	Total	Galled	Galled with internal lesions	With no symptoms
B7678-17	25	0	3	22
BR7085-1	25	4	1	20
CA23-6	25	0	6	19
CA25-6	25	0	4	21
CA26-2	25	4	2	19
CA40-7	25	0	15	10
W280-11	25	0	3	22
W326-1	25	2	9	14
W330-1	25	0	2	23
W347-1	25	6	13	6
W377-2	25	0	0	25
W415-1	25	0	0	25
W356-1	25	0	0	25
W376-1	25	0	0	25
W460-4	25	0	2	23
W498-1	25	0	1	24
WC285-141	25	0	1	24
WC304-4	25	4	3	18
WC314-2	25	0	5	20
Nooksack	25	0	0	25
Russet Burbank	25	0	15	10

WEST VIRGINIA

R. J. Young^{1/} and K. L. Deahl^{2/}

Potato Late Blight

Late blight of potato caused by Phytophthora infestans (Mont.) de Bary, continues to pose a serious threat to potato production in West Virginia as well as in other areas of the Northeast Region of the United States. In 1973, commercial plantings located in the Tygart River Valley and in Nicholas County, West Virginia were attacked by P. infestans in late July; yields were reduced by an estimated 40-60 percent. Early defoliation due to the disease was considered to be primarily responsible for the marked reduction in yield. Some tuber rot was reported. Annual reports of potato late blight in home garden and in commercial areas emphasize the importance of a continuing search for new sources of resistance. The West Virginia potato breeding program emphasizes the incorporation of late blight resistance into lines acceptable for commercial production.

Multigenic Late Blight Test 1973. As in previous years, the blight test was conducted in field plots located along the Tygart River near Huttonsville, West Virginia. The seed was machine planted on May 22, and consisted of three replications with each replication comprised of five hills. Fertilizer (12-24-24) and disyston (15% granular) were incorporated at planting according to standard recommendations. Border rows and every third row (equaling approximately 1/5 of the total foliage) throughout the plot were planted with WV5-3 (R₂R₄) and WV11-32 (R₂R₃). This was done to insure a reservoir of susceptible foliage and a continued release of inoculum over an extended period. On July 23, the plot was inoculated with a sporangial-zoospore suspension of race-1,2,3,4 of P. infestans. Inocula was produced on Kennebec tuber slices and on lima bean slants eight-ten days in age. Environmental conditions were nearly optimal with the temperature at 13° C and a natural dew present. Zoospore activity was minimal and only spreader rows were inoculated. Non-sporulating "blight specks" were found on the inoculated foliage on July 27. Also on this date, sporulating "blight spots" were found on the varieties Abnaki, Russet Rural, Katahdin and Kennebec indicating that the plot had been subjected to inoculum from nature on or about July 18. An isolate obtained from Katahdin foliage was later determined to be race 1,4 of P. infestans.

Initial evaluations were made on August 7, at which time, Irish Cobbler and Katahdin were 50 and 20 percent defoliated, respectively. Results of this test are presented in West Virginia Table 1.

The 18 selections of S. tuberosum ssp. andigena obtained from Dr. David Thurston is a part of the continuing research for new sources of resistance. Although most entries became infected, there was a marked reduction in the number of spores produced in diseased tissues.

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Control of potato late blight might be accomplished best by integrating natural resistance (vertical and horizontal) with fungicides. Vertical resistance derived from Solanum demissum Lindl has failed to provide permanent protection against Phytophthora infestans (Mont.) de Bary. As a result, potato breeders have altered their approach by attempting to incorporate the more stable, but less spectacular horizontal type of resistance into commercial varieties. It appears, at the moment, that neither type of resistance, individually or in combination, is sufficient to prevent crop loss resulting from infection.

In 1973, a trial was conducted in plots near Huttonsville, West Virginia. The experiment was a replicated, randomized-block design utilizing four varieties differing with respect to vertical and horizontal resistance. Planting was on May 22. Fertilizer (1,000 lbs, 5-10-10) and Disyston (15 lbs, 15% granular) were incorporated in the planting rows. Plots were 50 ft. long and 30 ft. of each row were harvested for yield data.

Inoculator rows were planted with Russet Rural (R-0), WV5-3 (R₂R₄) and WV11-32 (R₂R₃). These varieties are completely susceptible to West Virginia isolate No. 167 (race - 1,2,3,4) of P. infestans. Inoculations were made on July 22, 1973 during the late evening hours. A natural dew had formed and air temperature was nearly optimal at 13° C.

Treatment consisted of the following three schedules:

Treat. I, plants sprayed every seven-ten days with 2 lbs. Maneb (Dithane M-45/100 gal).

Treat. II, plants sprayed every 14-17 days with 2 lbs. Maneb (Dithane M-45/100 gal).

Treat. III, plants sprayed every 21-23 days with 2 lbs. Maneb (Dithane M-45/100 gal).

All treatments received insecticide applications (Thiodan) weekly. Potato vines were destroyed chemically on September 28, 1973 and the plots were harvested October 17, 1973. Results of the trial are presented in West Virginia Table 2.

Abnaki is a medium to late variety producing good yields of smooth, oblong, white tubers. It is highly susceptible to P. infestans and, as the results indicate, was the only variety responding to application of fungicide. Sebago possesses no vertical resistance but does have a moderate to low level of horizontal resistance. The level of resistance is reflected in the slower rate of defoliation. However, no apparent benefit was derived from any spray schedule. Both seedlings, B6028-WV6 and B6026-WV5, carry vertical resistance as well as moderate to high levels of horizontal resistance. These seedlings are more resistant under West Virginia conditions than they are in Mexico in the Toluca Valley (B6028-WV6, 3+) (B6026-WV5, 2+). As with Sebago, the seedling varieties did not show any significant increase in yield from increased applications of fungicide.

Reedsville Yield Test 1973. The field plots were hand planted into preformed rows on May 16, 1973. Fertilizer (12-12-24) and Disyston (15% granular) were incorporated at rates of 200 lb. N and 15 lb. per acre, respectively. One half of the fertilizer was broadcast and plowed down, the remainder was applied to rows immediately prior to planting. The test consisting of 25 entries, including standard control varieties, was planted in a randomized block design in six replications. Each replication contained 25 hills. Potato vines were destroyed on September 14 and tubers harvested on September 27. The results of this test are presented in West Virginia Table 3. Additional information is provided in terms of late blight infection, glycoalkaloid content of tubers, and general tuber characteristics. Total glycoalkaloid was determined by the rapid method of Bretzloff (1), approximately one month after harvest. Tubers were stored at 7° C until analyzed.

1/ Bretzloff, C. W. 1970. A method for the rapid estimation of glycoalkaloids in potato tubers. Amer. Potato. J. 48: 158-162.

1973 Field No.	Pedigree	8-7	8-16	8-23	Readings ^{1/} 8-29	9-5	9-14	9-21
267	I. Cobbler (R ₀)	3	4+	5	5	5	5	5
268	Katahdin (R ₀)	2+	4+	5	5	5	5	5
269	Kennebec (R ₁)	2+	4	4+	4+	5	5	5
271	Penchip	0	1+	2	3-	3-	2+	3-
272	Pentland Ace (R ₃)	1	2	3-	4-	5	5	5
274	Sebago (R ₀)	1+	3-	3+	4+	4+	5	5
276	3R _c -8 (R ₂)	1+	2+	3	4+	5	5	5
277	1563 _c (R ₄)	2+	3+	4+	5-	5	5	5
279	WV5-3 (R ₂ R ₄)	1-	2	3+	4+	4	5-	5
280	WV11-32 (R ₂ R ₃)	2	2	3+	3	4-	5	5
281	WV14-17 (R ₁ R ₃)	0	0	0	0	0	0	0
282	B5141-6 (R ₁)	3+	4+	5-	5-	5	5	5
283	B3720-WV4	0	1+	0	0	3	3	3
284	B5264-WV6	1	1+	0	0	1+	0	0
286	B5662-WV4	1-	2	2+	0	3	3	-*
289	BR5991-WV13	1+	2	2+	0	0	0	0
290	BR5991-WV16	1+	2	2	1+	1+	0	0
291	BR5991-WV25	2+	1+	1+	2	0	0	0
292	B6039-WV2	2	1	1+	2	1-	0	0
293	B6039-WV6	1-	1	1	1+	0	0	0
294	B6043-WV6	1+	1	1	1	0	0	0
295	B6086-WV21	1	1+	2	1+	0	0	0
301	B6928-WV2	1+	2+	3	2+	2+	4+	4+
303	B6928-WV14	2	2+	3	3+	4	4+	5-
305	B6026-WV5	0	0	0	0	0	0	0
307	B6935-WV2	1-	1-	1+	1+	3	-*	5
310	B6949-WV3	1+	2+	3	3-	2	3+	4-
315	B6960-WV2	1+	1	1	0	0	1	0
317	B6960-WV4	2+	1+	3-	3-	3-	3+	3+
319	B6964-WV1	2	2-	3-	2+	3	1*	5
320	B6964-WV3	2+	3-	3	2+	2+	3+	4+
321	B6975-WV1	2+	3	3	3-	3+	4	5
327	B6981-WV4	1+	2+	2+	3-	3	4+	5
328	B6988-WV1	1	1+	2+	1+	3	-*	4+
330	B6988-WV5	1+	1+	0	0	0	0	0
336	B6988-WV15	1-	1-	0	1-	0	1+	0
341	B6992A-WV8	1+	1+	2-	1+	2	5*	5
350	B7023-WV1	0	0	0	2-	2+	0	0

351	B7023-WV2	0	0	0	1+	2+	-*	-*
365	B6761-11	1	1+	0	0	0	-*	-*
366	B6761-12	0	0	0	0	0	0	0
368	B4784-1	1	1	2-	1+	3-	-	-*
371	B5422-10	1+	1+	2-	2-	2-	-*	-*
376	BR5991-25	0	0	0	0	0	0	0
379	B6139-11	1	1+	2+	2	3-	1+	1+
388	B6097-9	2-	2-	2+	2	2+	3+	4+
391	BR6312-2	1+	2	2+	3-	2+	0	0

Solanum tuberosum ssp. andigena 2/

408	N501-4	0	0	1+	3-	2+	3	4+
409	N500-6	0	0	0	3+	4	5	5
410	N501-5	0	3-	1+	2+	2+	4	5
411	N502-3	1	2	3	2+	2	4	5
412	N502-10	0	1	3	-	3+	5	5
413	N502-20	0	0	1+	0	-*	-*	5
414	N511-2	1	0	0	1	2+	3+	4+
415	N513-1	0	0	0	0	0	0	-*
416	N513-2	0	1+	0	0	0	2-	3-
417	N513-4	0	1+	1+	1	1+	3+	5
418	N513-9	0	1+	2	2-	1+	3+	4
419	N513-10	0	0	0	0	0	0	0
420	N558-27	0	0	2-	0	0	3+	4
421	M1226-12	0	0	2+	2-	5-	5	5
422	M12777-2	2	3-	3+	2+	4	3+	5
423	M1278-9	0	0	1+	0	0	4+	5
424	1281-20	0	0	1+	0	0	0	0
425	N503-149	0	0	1+	0	1+	0	5*

1/Evaluation scale: 0 = No blight; 1 = trace; 2 = less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation; 5 = plants dead from late blight.

2/Selection provided by D. R. Thurston, Cornell Univ.

*Severe air pollution injury, difficult to determine extent of injury resulting from blight.

West Virginia Table 2. Influence of spray timing on disease index and yield of four potato varieties with varying degrees and types of resistance to P. infestans.

	7/27 ^{1/}	8/3	8/10	8/17	Defoliation ^{2/}		8/31	9/7	9/24	Yield ^{3/}
					8/24	8/24				
Abnaki										
8 sprays I	1+	2+	3+	4	4+		5	5	5	157 (a)
4 sprays II	2	3+	4	4+	5-		5	5	5	110 (ab)
3 sprays III	2	4-	4+	5	5		5	5	5	92 (b)
Sebago										
8 sprays I	0	0	1+	2	3+		4	4+	5	177 (c)
4 sprays II	0	1+	2	3+	4		4+	4+	5	180 (c)
3 sprays III	0	1+	2+	3	4		4+	4+	5	184 (c)
B6028-WV6										
8 sprays I	0	0	0	0	0		0	0	0	210 (d)
4 sprays II	0	0	0	0	0		0	0	0	252 (d)
3 sprays III	0	0	0	0	0		0	0	0	184 (d)
B6026-WV5										
8 sprays I	0	0	0	0	0		0	0	0	219 (e)
4 sprays II	0	0	0	0	0		0	0	0	300 (f)
3 sprays III	0	0	0	0	0		0	0	0	345 (f)

^{1/}Abnaki was moderately infected by a race of P. infestans from nature.

^{2/}Evaluating scale: 0 = no blight; 1 = trace; 2 = less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation; 5 = plants dead.

^{3/}Total yield expressed as CWT/A. Treatments sharing the same letter are not statistically different.

West Virginia Table 3. Yield, blight reading, tuber glycoalkaloid content, and tuber rating of 25 varieties grown at Reedsville, West Virginia. 1973.

Field No.	Pedigree	Total ¹ / No. #	Yield ² / cwt/A	Blight ³ / 8/29/73	TGA ⁴ / Tuber	Tuber ⁵ / Character
1	22	B6981-WV4	431.0	360.2	a	3-6
2	11	B608GWV21	430.0	358.5	ab	22.8
3	6	BR 5991-WV13	368.25	298.6	abc	28.8
4	20	B6949-WV6	358.75	290.5	abcd	4.8
5	3	Kennebec	351.5	282.5	cdc	28.0
6	10	B6043-WV6	346.0	277.1	cdef	12.0
7	1	Abnaki	340.0	271.33	cdef	11.6
8	15	B6928-WV14	326.75	258.3	cdef	18.0
9	14	B6928-WV2	318.5	250.4	cdef	27.9
10	7	BR5991-WV16	310.5	242.6	cdefg	30.24
11	2	Alamo	307.0	239.4	cdefgh	16.0
12	19	B6935-WV2	296.75	229.3	cdefghi	9.6
13	9	B6039-WV9	293.25	226.6	defghij	50.4
14	25	B6988-WV8	292.5	225.1	defghij	8.8
15	23	B6964-WV1	285.75	218.15	defghijk	2.7
16	8	B6039-WV6	279.5	212.6	fghijk	58.0
17	13	B6140-WV3	278.0	210.9	fghijk	27.2
18	12	B6140-WV6	270.3	203.9	fghijk1	29.7
19	24	B6988-WV5	270.25	203.3	fghijk1	-
20	4	B662-WV4	240.0	174.3	ghijklm	10.8
21	5	B5662-WV13	232.25	166.75	kjklm	18.0
22	21	B6949-WV7	229.75	164.4	ijklm	4.8
23	17	B6026-WV5	220.0	154.5	jklm	10.0
24	18	B6935-WV1	202.5	132.0	lm	16.8
25	16	B6028-WV6	182.0	117.9		7.2

¹/Total yield in pounds of U.S. No. 1 potatoes; value differing by more than 75# are significantly different, P = 0.05.

²/Yield converted to cwt/A.

³/Late blight evaluation scale: 0 = no blight; 1 = trace; 2 = less than 10% defoliation; 3 = 50% defoliation; 4 = 75% defoliation; 5 = plants dead from late blight.

⁴/TGA = Total glycoalkaloid content, expressed as µg TGA/100 gm fresh wt.

⁵/Tuber characteristics: 1 = poor type; 5 = excellent type.

WYOMING

K. E. Bohnenblust

The variety trials in Wyoming were planted on the Jay Brown farm near Pine Bluffs, at the USDA Horticultural Station near Cheyenne, and at the Agricultural Substations at Powell and Torrington.

The nursery at Pine Bluffs was planted in the sequence of the regular planting of the field and by chance was placed in a relatively poor location. The variability due to location resulted in a relatively large LSD. However, Nampa had the highest yield at 234.1 hundred weight per acre and on the basis of two year's observations, it appears quite well adapted to the Pine Bluffs area; Nampa also was highest in specific gravity at 1.086. The "3" chip color of New Haig was the best in that category.

A heavy rain at the Cheyenne station flooded out three replications so the yields are based on single plots with no statistical analysis. The 261.4 hundred weight per acre made Chieftain the best yielder. ALK 35 had a chip color rating of 3 to be the best in that respect. The same variety also had the highest specific gravity at 1.091.

At Powell, the performance of several varieties was poor because of poor stands.

Red LaSoda was by far the best yielding variety, 280.7 hundred weight per acre, but the LSD was so large that it was not significantly different than the yields of Russet Burbank and Norgold. The samples were not available for specific gravity or chip color.

Irrigation at Torrington was inadequate and uneven. This was reflected in some poor yields and a very large LSD. The yield of A6371-2 was best at 273.5 hundred weight per acre. The highest specific gravity, 1.088, was that of A6611 9-7. The best chip color was the 3 shared by Hi-Plains, A642D 6-4, and Nooksack.

Wyoming Table 1. Potato variety yield trial, Pine Bluffs, 1973.^{1/}

<u>Variety</u>	<u>Total Yield</u> <u>cwt/acre</u>	<u>%</u> <u>No. 1</u>	<u>Specific</u> <u>Gravity</u>	<u>Chip</u> <u>Color</u>
Nampa	234.1	77	1.086	5
W701	227.5	80	1.075	4
Chieftain	220.8	76	1.074	6
Red La Soda	214.2	64	1.074	6
ALK 5-3	203.3	75	1.083	7
New Haig	201.5	73	1.076	3
Rus. Bur.	201.5	71	1.077	5
Red La Soda Sel.	196.0	78	1.067	7
Norgold Sel.	182.7	69	1.075	8
Norgold	171.8	67	1.081	8
Cascade	157.3	73	1.076	6
Targhee	155.5	73	1.080	5
General mean	197.2			
LSD .05	62.0			

^{1/} Date planted - May 25
 Spacing - rows 36 inches apart, hills 12 inches apart
 Planted in 1-row plots, 30 ft. long, 4 replicated blocks
 Previous crop - potatoes
 Fertilizer - 10-34-0 at 15 gal/A + 80 lbs. available N/A (sprinkler)
 Irrigation - sprinkler
 Date of killing frost - October 2
 Date of harvest - September 27
 Specific gravity obtained - November 14
 Chipping date - November 20

Wyoming Table 2. Potato variety yield trial, Cheyenne, 1973.^{1/}

<u>Variety</u>	<u>Total Yield cwt/acre</u>	<u>Specific Gravity</u>	<u>Chip Color</u>
Chieftain	261.4	1.078	7
Russet Burbank	256.5	1.089	5
ALK 5-3	215.4	1.088	6
Targhee	215.4	1.082	7
ALK 35	213.0	1.091	3
W701	198.4	1.083	6
Nampa	183.9	1.086	7
Viking	174.2	1.070	7
General mean	214.8		

^{1/} Date planted - May 23
 Spacing - rows 36 inches apart, hills 12 inches apart
 Planted in 1-row plots, 30 ft. long
 Previous crop - grass
 Fertilizer - 10-20-0 at 100 lbs./A.
 Irrigation - sprinkler
 Date of killing frost - September 20
 Date of harvest - October 11
 Specific gravity obtained - November 7
 Chipping date - November 16

Wyoming Table 3. Potato variety yield trial, Powell, 1973.^{1/}

<u>Variety</u>	<u>Total Yield cwt/acre</u>	<u>% No. 1</u>
Red LaSoda	280.7	77
Russet Burbank	196.0	68
Norgold	188.8	82
Nampa	180.3	83
ALK 35	158.5	74
W701	144.0	76
ALK 5-3	130.7	78
Norgold Sel.	115.0	81
Targhee	107.7	91
Wyred	92.0	87
Viking	71.4	89
Cascade	62.9	60
General mean	144.0	
LSD .05	97.9	

^{1/} Date planted - May 24
 Spacing - rows 36 inches apart, hills 12 inches apart
 Planted in 1-row plots, 30 ft. long, 4 randomized blocks
 Previous crop - alfalfa
 Fertilizer - None
 Irrigation - furrow
 Date of killing frost - September 17
 Date of harvest - October 10

Wyoming Table 4. Potato variety yield trial, Torrington, 1973.^{1/}

<u>Variety</u>	<u>Total Yield cwt/yield</u>	<u>% No. 1</u>	<u>Specific Gravity</u>	<u>Chip Color</u>
A6371-2	273.5	71	1.085	7
Red LaSoda	222.6	76	1.075	7
Russet Burbank	174.2	80	1.078	5
X-F Russet Burbank	171.8	67	1.085	4
A63126-9	121.8	73	1.080	6
Hi Plains	112.1	82	1.075	3
Red LaSoda Sel.	92.8	79	1.070	7
A642D 6-4	78.2	79	1.076	3
Nooksack	66.9	70	1.085	3
A6611 9-7	63.7	63	1.088	5
General mean	137.8			
LSD	119.4			

^{1/} Date planted - May 24
 Spacing - rows 36 inches apart, hills 12 inches apart
 Planted in 1 row plots, 30 ft. long, 3 replicated blocks
 Previous crop - alfalfa
 Fertilizer - 90 lbs. N, 90 lbs. P₂O₅/A. sidedress
 Irrigation - furrow
 Date of killing frost - September 26
 Date of harvest - October 2
 Specific gravity obtained - November 23
 Chipping date - December 7

